

City of Baltimore

Department of Public Works

Standard Details

March 2008

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
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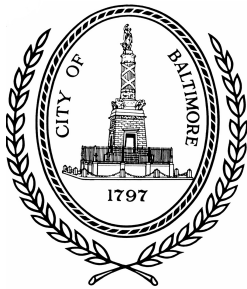
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BC 389.04	Standard Median Ditches - Trapezoidal	1 of 1
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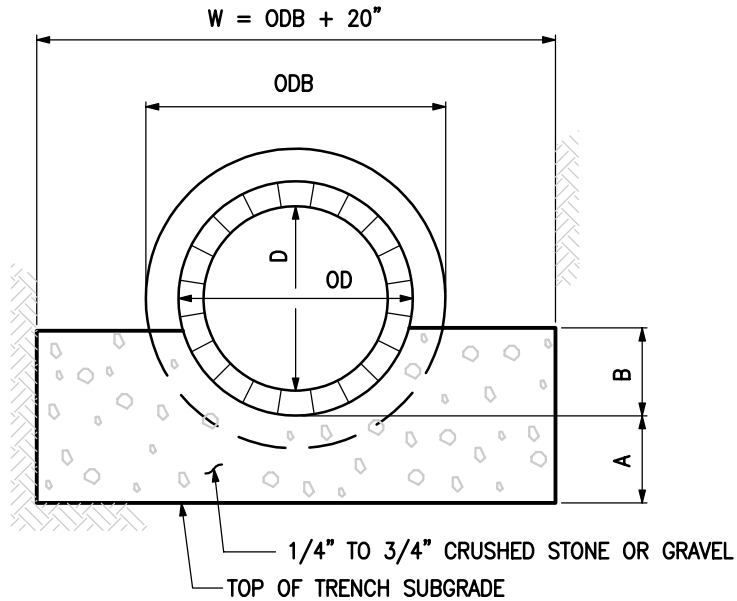
**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
STORM WATER CROSS INDEX OF DRAWINGS**

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	BC 302.04	Gravel Cradle for HDPE Storm Drains	1 of 1
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BC 320.01	BC 320.01	Brick and Concrete Curves for Storm Drains	1 of 1
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	BC 380.06	Curved Vane (S-CV) Grate(s) with Class 35 Type 'S' Frame New Construction	1 of 1
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BC 379.99	BC 380.99	Method of Depressing Paving at Inlets	1 of 1
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BC 383.11	BC 383.21	Standard 24 In. Manhole Cover	1 of 1
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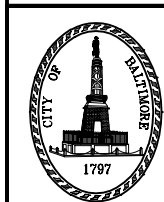
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BC 386.51	BC 386.51	Concrete Encasement for Storm Drains	1 of 1
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BC 389.02	BC 389.02	Standard Side Ditches - V Slope	1 of 1
BC 389.03	BC 389.03	Standard Side Ditches - Trapezoidal	1 of 1
BC 389.04	BC 389.04	Standard Median Ditches - Trapezoidal	1 of 1
BC 389.05	BC 389.05	Standard Median Ditches - V Slope	1 of 1



NOTES:

1. STONE (NO. 6 AGGREGATE) MAY BE SUBSTITUTED FOR GRAVEL.
2. WHEN 2 TIER TRENCH SUPPORT IS REQUIRED, ADD 24" TO "W" FOR CALCULATING THE AMOUNT OF PAVING NEEDED FOR TRENCH REPAIR.

REINFORCED CONCRETE PIPE					
DIMENSIONS					
D	OD	ODB	A	B	W
15"	19"	23"	7"	6"	43"
18"	22.5"	27"	7"	6"	47"
21"	25.75"	30.5"	7"	6"	50.5"
24"	29"	34"	7"	6"	54"
27"	32.25"	37.5"	7"	6"	57.5"
30"	36"	41.5"	7"	6"	61.5"
33"	39.5"	45.5"	7"	6"	65.5"
36"	42.75"	49"	8"	6"	69"
42"	50"	57.5"	8"	6"	77.5"
48"	57"	66"	9"	6"	86"
54"	64"	72.5"	9"	7"	92.5"
60"	72"	75.5"	6"	8"	95.5"
66"	79"	81"	6"	8"	101"
72"	86"	88"	6"	9"	108"



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GRAVEL CRADLE FOR
RCP STORM DRAINS

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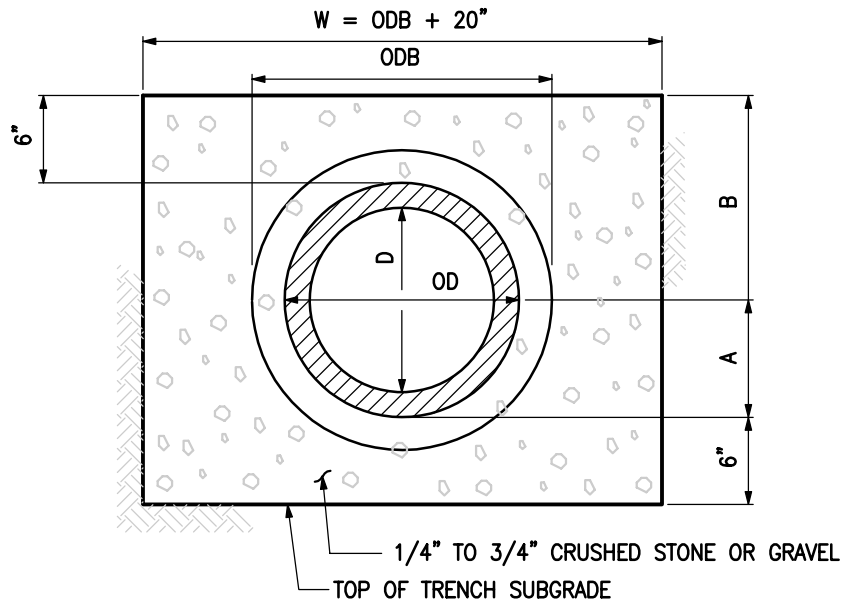
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3 / 2008

STANDARD NO.
BC 302.02

SCALE : NONE

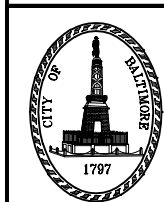
SHEET 1 OF 1



NOTES:

1. STONE (NO. 6 AGGREGATE) MAY BE SUBSTITUTED FOR GRAVEL.
2. WHEN 2 TIER TRENCH SUPPORT IS REQUIRED, ADD 24" TO "W" FOR CALCULATING THE AMOUNT OF PAVING NEEDED FOR TRENCH REPAIR.
3. HAUNCHING AREA (A) AROUND THE PIPE SHALL BE COMPACTED TO A MINIMUM 95% PROCTOR DENSITY. TAMPING SHALL BE DONE IN 4" LAYERS TO THE SPRING LINE. COMPACTION OF THE EMBEDMENT MATERIAL SHOULD BE DONE IN A WAY THAT THE COMPACTION EQUIPMENT WILL NOT DAMAGE THE PIPE OR CAUSE DEFLECTION OF/IN THE PIPE. WHEN HYDRO-HAMMERS ARE USED TO ACHIEVE COMPACTION THEY SHOULD NOT BE USED WITHIN 3' OF THE TOP OF PIPE AND THEN ONLY IF THE EMBEDMENT MATERIAL DENSITY HAS BEEN PREVIOUSLY COMPACTED TO A MINIMUM 85% PROCTOR DENSITY.

PVC PIPE						
DIMENSIONS						
D	OD	ODB	A	B	W	
					MIN	MAX
6"	6.25"	7"	3.13"	9.13"	30"	60"
8"	8.5"	9.5"	4.25"	10.25"	30"	60"
10"	10.5"	12"	5.25"	11.25"	30"	60"
12"	12.5"	14"	6.25"	12.25"	36"	60"
15"	15.25"	16.5"	7.63"	13.63"	42"	60"
18"	18.75"	20"	9.38"	15.38"	42"	66"
21"	22"	23.5"	11"	17"	48"	66"
24"	24.75"	26.5"	12.38"	18.38"	48"	72"
27"	28"	30"	14"	20"	54"	78"



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GRAVEL CRADLE FOR
PVC STORM DRAINS

ISSUED

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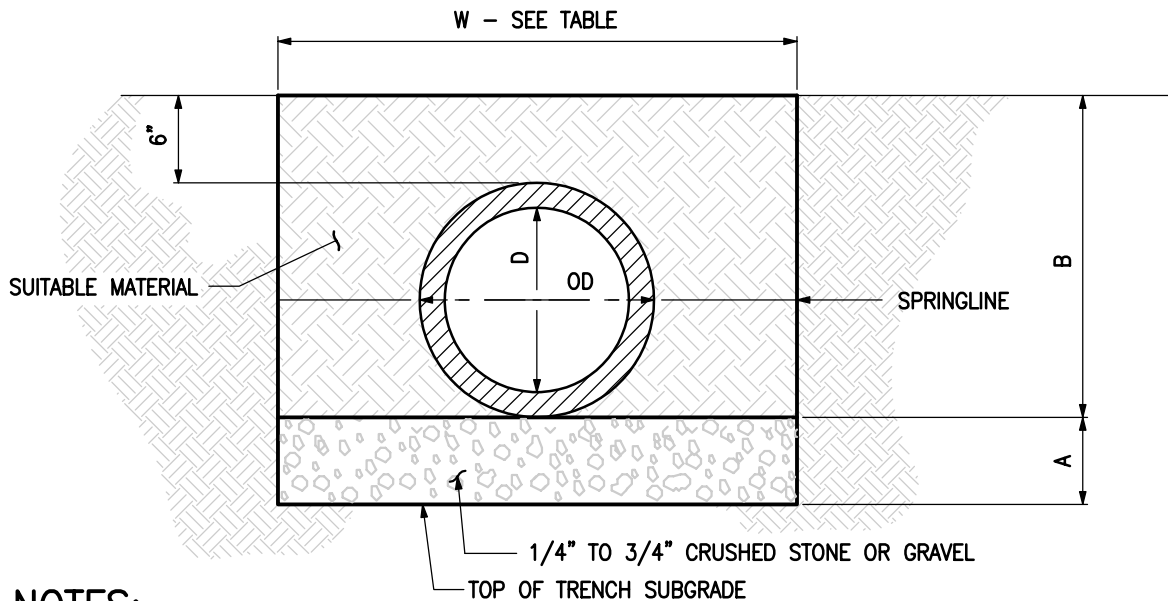
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3 / 2008

STANDARD NO.
BC 302.03

SCALE : NONE

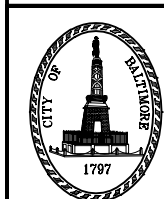
SHEET 1 OF 1



NOTES:

1. NO. 57 AGGREGATE MAY BE SUBSTITUTED FOR GRAVEL.
2. WHEN 2 TIER TRENCH SUPPORT IS REQUIRED, ADD 24" TO "W" FOR CALCULATING THE AMOUNT OF PAVING NEEDED FOR TRENCH REPAIR.
3. HAUNCHING AREA (A) AROUND THE PIPE SHALL BE COMPACTED TO A MINIMUM 95% PROCTOR DENSITY. TAMPING SHALL BE DONE IN 4" LAYERS TO THE SPRING LINE. COMPACTION OF THE EMBEDMENT MATERIAL SHOULD BE DONE IN A WAY THAT THE COMPACTION EQUIPMENT WILL NOT DAMAGE THE PIPE OR CAUSE DEFLECTION OF/IN THE PIPE. WHEN HYDRO-HAMMERS ARE USED TO ACHIEVE COMPACTION THEY SHOULD NOT BE USED WITHIN 3' OF THE TOP OF PIPE AND THEN ONLY IF THE EMBEDMENT MATERIAL DENSITY HAS BEEN PREVIOUSLY COMPACTED TO A MINIMUM 85% PROCTOR DENSITY.
4. ALL SUITABLE MATERIAL EXCAVATED FROM UTILITY TRENCHES SHALL BE USED AS FAR AS PRACTICABLE, FOR BACKFILL IN TRENCHES. SOILS AND SOIL AGGREGATE MIXTURES USED AS TRENCH BACKFILL SHALL CONFORM TO THE MINIMUM COMMON BORROW REQUIREMENTS IN THE CITY SPECIFICATIONS FOR MATERIALS, HIGHWAYS, BRIDGES, UTILITIES, AND INCIDENTAL STRUCTURES.

HDPE PIPE				
DIMENSIONS				
D	OD	A	B	W
12"	14.2"	4"	20.2"	30"
15"	17.7"	4"	23.7"	34"
18"	21.5"	4"	27.5"	39"
24"	28.4"	4"	34.4"	48"
30"	35.5"	6"	41.5"	56"
36"	41.4"	6"	47.4"	64"
42"	48.0"	6"	54.0"	72"
48"	54.0"	6"	60.0"	80"
54"	61.0"	6"	67.0"	88"
60"	67.3"	6"	73.3"	96"



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GRAVEL CRADLE FOR
 HDPE STORM DRAINS

ISSUED

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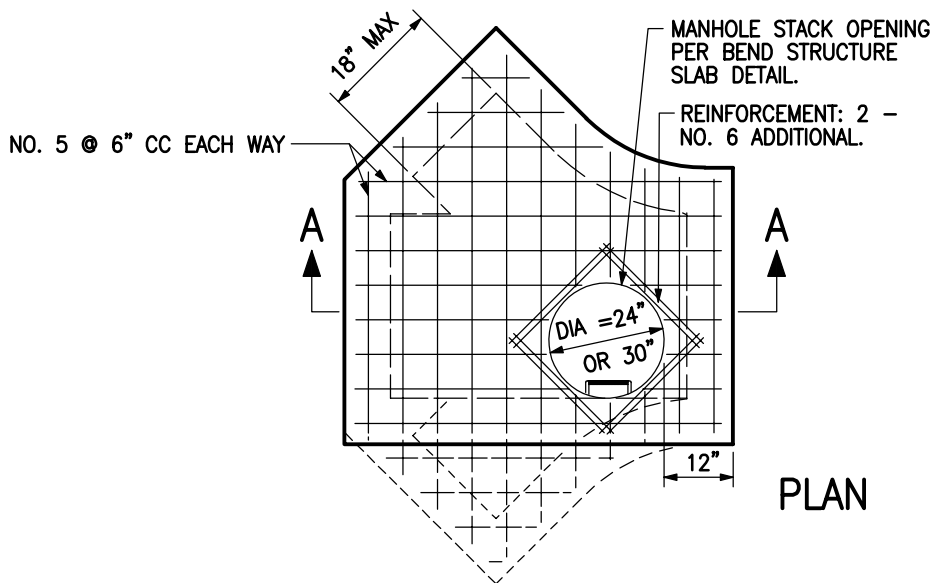
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3 / 2008

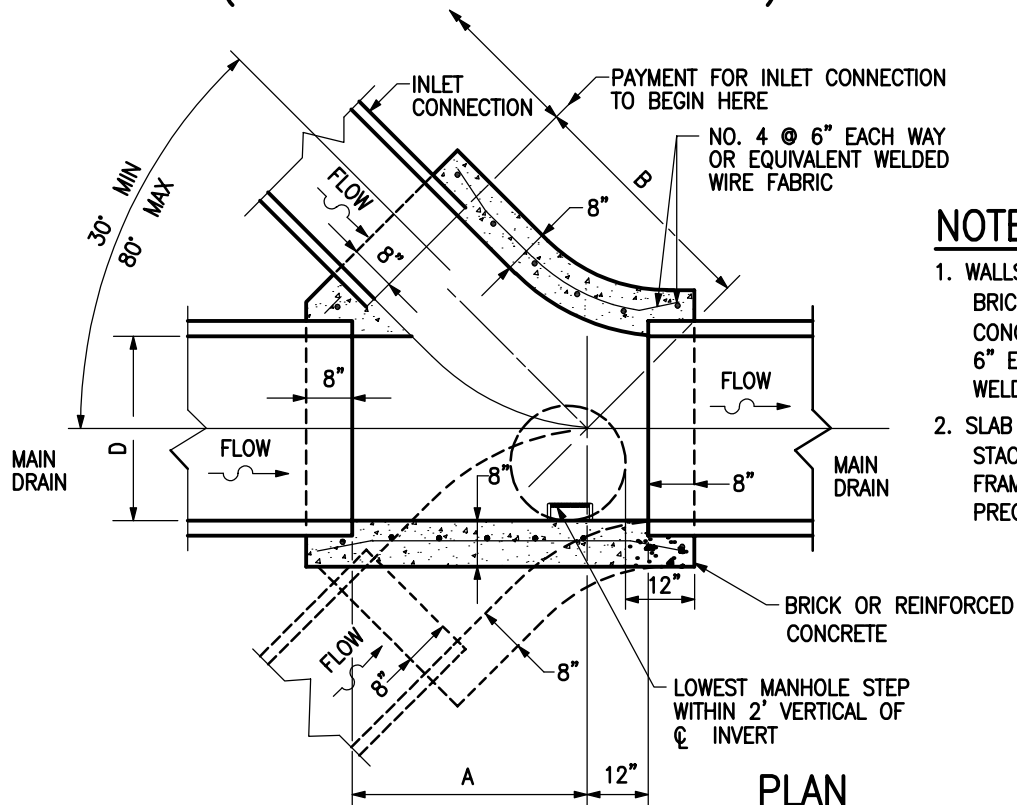
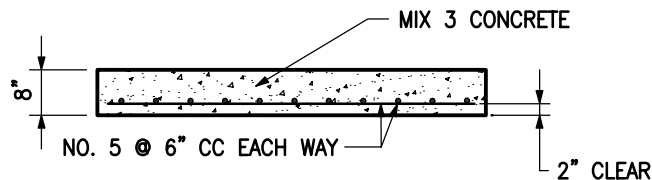
STANDARD NO.
 BC 302.04

SCALE : NONE

SHEET 1 OF 1



MINIMUM DIMENSIONS		
D	A	B
15"-18"	3'-9"	2'-9"
21"-30"	4'-4"	3'-7"
33"-36"	4'-7"	3'-11"



NOTES:

1. WALLS AND BOTTOM SHALL BE BRICK OR MIX 3 REINFORCED CONCRETE. USE NO. 4 BARS AT 6" EACH WAY OR EQUIVALENT WELDED WIRE FABRIC.
2. SLAB OPENING FOR MANHOLE STACK IS 3' DIA EXCEPT WHERE FRAME INSTALLED WITHOUT PRECAST MANHOLE RISER.



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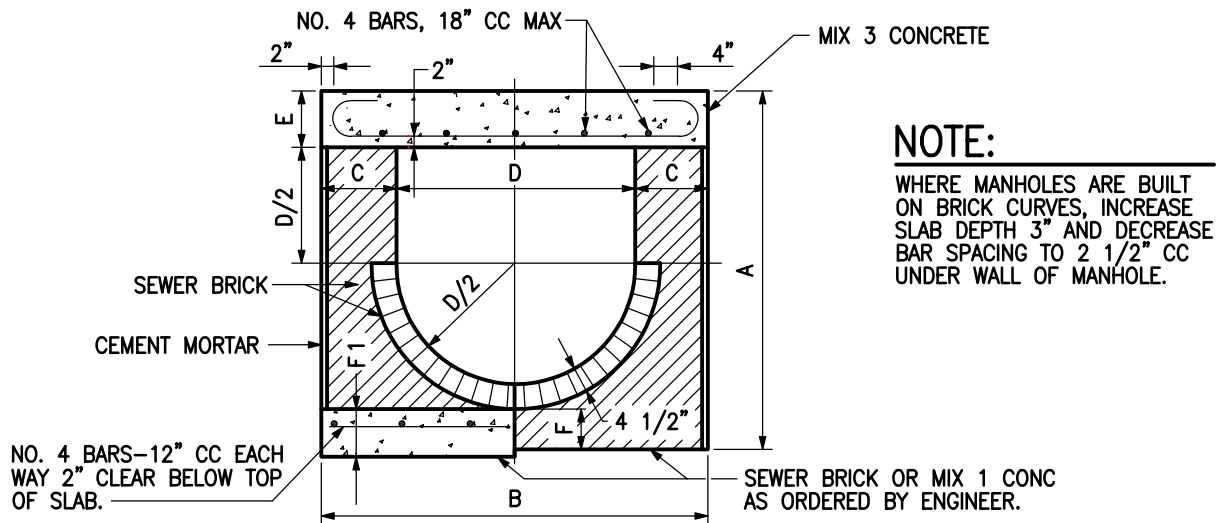
[Signature]

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DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

CONCRETE OR
BRICK "Y"
SINGLE OR DOUBLE


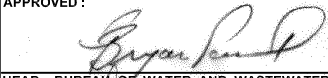
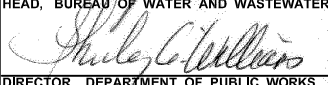
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 318.02		
SCALE: NONE		SHEET 1 OF 1

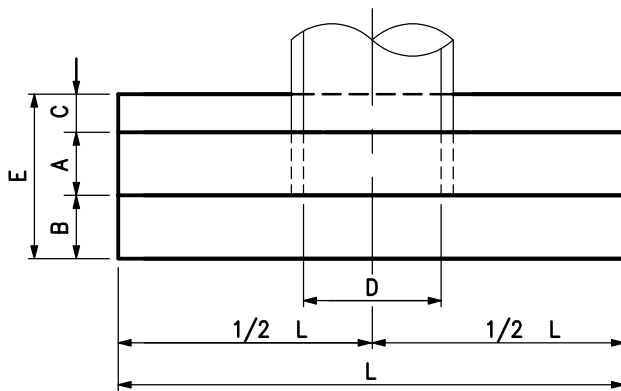


DIMENSIONS								
D	A	B	C	E	F	F1	STEEL	NO. OF TEMP BAR
24"	3'-5"	3'-6"	9"	8"	4 1/2"	6"	NO. 5 BARS @ 10" CC	3
27"	3'-8"	3'-9"	9"	8"	4 1/2"	6"	NO. 5 BARS @ 8" CC	3
30"	3'-11"	4'-0"	9"	8"	4 1/2"	6"	NO. 5 BARS @ 7" CC	3
33"	4'-2"	4'-3"	9"	8"	4 1/2"	6"	NO. 5 BARS @ 6" CC	3
36"	4'-5"	4'-6"	9"	8"	4 1/2"	6"	NO. 5 BARS @ 5" CC	3
42"	5'-3"	5'-8"	13"	10"	6 1/2"	8"	NO. 5 BARS @ 6" CC	5
48"	5'-9"	6'-2"	13"	10"	6 1/2"	8"	NO. 5 BARS @ 5" CC	5
54"	6'-3"	6'-8"	13"	10"	6 1/2"	8"	NO. 6 BARS @ 8" CC	5
60"	6'-9"	7'-2"	13"	10"	6 1/2"	8"	NO. 6 BARS @ 6" CC	5

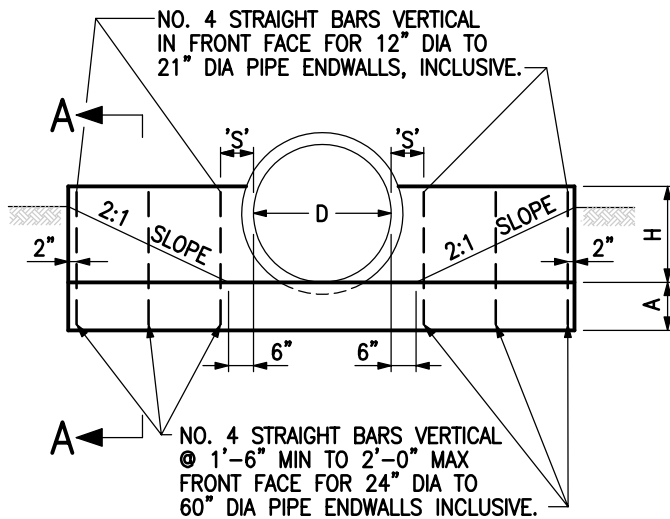
QUANTITIES PER LINEAR FOOT				
SIZE	MIX 3 CONC CU YDS	BRICK (FLAT) CU YDS	BRICK (ON EDGE) CU YDS	STEEL LBS
24"	0.0864	FOR BRICK BOTTOM	0.1724	7.235
27"	0.0926		0.1920	8.934
30"	0.0988		0.2121	10.369
33"	0.1049		0.2327	12.286
36"	0.1111		0.2538	14.968
42"	0.1749		0.4374	16.576
48"	0.1903		0.4985	20.474
54"	0.2058		0.5616	20.344
60"	0.2212		0.6266	27.513

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY.

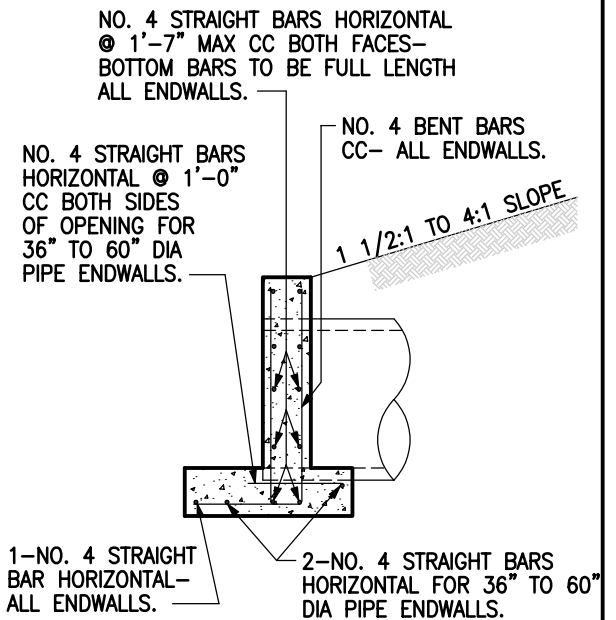
	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		BRICK AND CONCRETE CURVES FOR STORM DRAINS	3 / 2008	
			STANDARD NO. BC 320.01		SCALE : NONE SHEET 1 OF 1



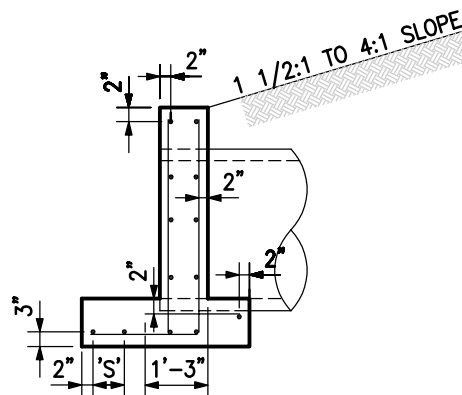
PLAN



ELEVATION



SECTION A - A



DISPOSITION OF BARS DETAIL

NOTES:

1. SPECIFICATIONS: LATEST DPW
2. CONCRETE: CONCRETE SHALL BE MIX 3
3. REINFORCING: DEFORMED STEEL BARS- NO. 4
4. CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED.



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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
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END SUPPORT WALL
 CIRCULAR AND ELLIPTICAL PIPE

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 350.02

SCALE : NONE SHEET 1 OF 2

OPENING		DIMENSIONS							QUANTITIES	
D	AREA	A	B	C	E	H	L	S	CONC CY	STEEL LBS
INCHES	SQ FT									
14" X 23"	1.8	9"	14"	6"	2'-5"	1'-2"	5'-11"	6"	0.54	33
19" X 30"	3.3	9"	14"	6"	2'-5"	1'-5"	7'-5"	6"	0.70	47
22" X 34"	4.1	12"	16"	10"	3'-2"	1'-7"	8'-2"	6"	1.30	57
24" X 38"	5.1	12"	16"	10"	3'-2"	1'-8"	8'-10"	6"	1.42	64
27" X 42"	6.3	12"	16"	10"	3'-2"	1'-10"	9'-7"	6"	1.57	72
29" X 45"	7.4	12"	16"	10"	3'-2"	1'-11"	10'-4"	8"	1.72	77
32" X 49"	8.8	12"	16"	10"	3'-2"	2'-1"	11'-3"	8"	1.92	85
34" X 53"	10.2	12"	20"	12"	3'-8"	2'-2"	12'-1"	8"	2.31	90
38" X 60"	12.9	12"	20"	12"	3'-8"	2'-6"	13'-7"	8"	2.70	102
43" X 68"	16.6	12"	20"	12"	3'-8"	2'-8"	14'-6"	8"	2.91	118


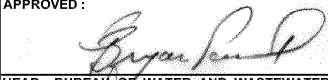
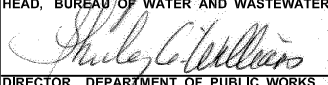
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

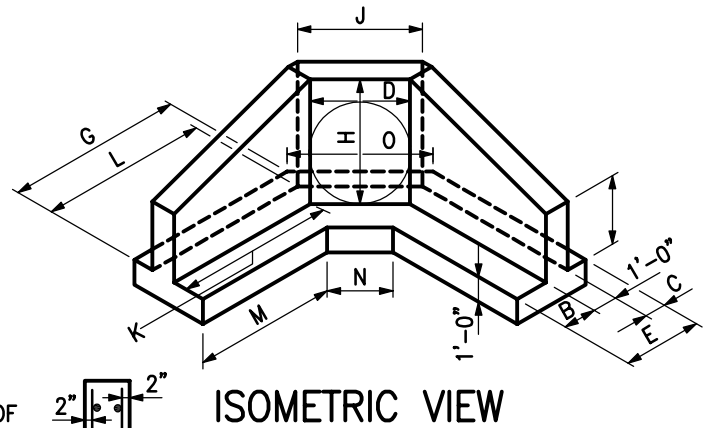
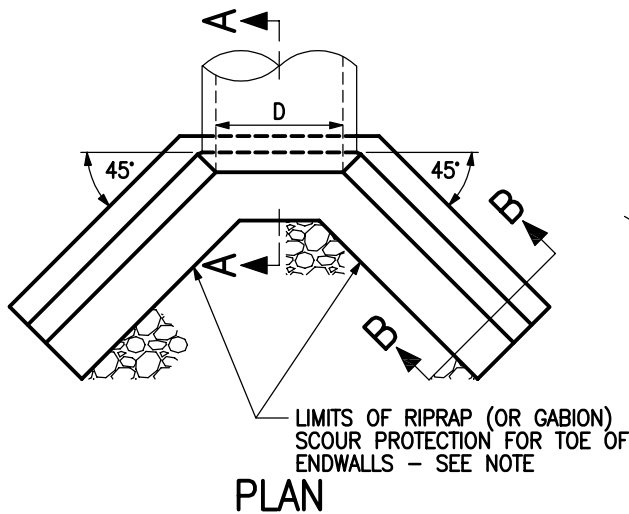
HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE

OPENING		DIMENSIONS							QUANTITIES	
D	AREA	A	B	C	E	H	L	S	CONC CY	STEEL LBS
INCHES	SQ FT									
12	0.79	9"	6"	6"	1'-9"	0'-10"	4'-0"	4"	0.27	24
15	1.23	9"	6"	6"	1'-9"	1'-0 1/2"	4'-9"	4"	0.34	26
18	1.77	9"	6"	6"	1'-9"	1'-3"	5'-6"	4"	0.41	29
21	2.40	9"	6"	6"	1'-9"	1'-5"	6'-3"	4"	0.48	33
24	3.14	9"	14"	6"	2'-5"	1'-6"	7'-0"	6"	0.67	38
27	3.98	9"	14"	6"	2'-5"	1'-8"	7'-9"	6"	0.77	49
30	4.91	9"	14"	6"	2'-5"	1'-9"	8'-6"	6"	0.85	53
33	5.94	9"	14"	6"	2'-5"	1'-11"	9'-3"	6"	0.95	56
36	7.07	12"	16"	10"	3'-2"	2'-0"	10'-0"	6"	1.65	85
42	9.62	12"	16"	10"	3'-2"	2'-3"	11'-6"	8"	1.96	96
48	12.57	12"	16"	10"	3'-2"	2'-6"	13'-0"	8"	2.27	106
54	15.90	12"	20"	12"	3'-8"	2'-9"	14'-6"	8"	2.86	121
60	19.64	12"	20"	12"	3'-8"	3'-0"	16'-0"	8"	3.22	143

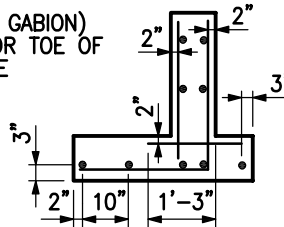
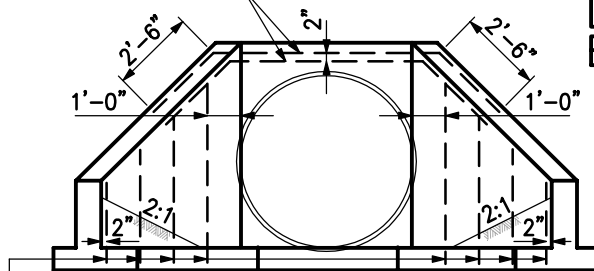
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

CIRCULAR REINFORCED CONCRETE PIPE

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 350.02		
			SCALE : NONE		SHEET 2 OF 2



4 NO. 6 BENT BARS HORIZONTAL
2 EACH FACE



NO. 4 BARS HORIZONTAL
@ 1'-0" CC BELOW
OPENING

GEOTEXTILE
3'-0" (MIN)

PROVIDE RIPRAP OR
GABIONS TO PREVENT
SCOUR AT TOEWALL
(COST SEPARATE)

SECTION A-A

NO. 4 BARS HORIZONTAL @ 1'-7"
MAX CC BOTH FACES BOTTOM
BARS BENT ALONG ENDWALL
OTHERS STRAIGHT.

NO. 4 BENT BARS @ 1'-0" CC BOTH
WINGWALLS - ALL ENDWALLS

1 NO. 4 BENT BAR HORIZONTAL
1 NO. 4 BENT BAR HORIZONTAL

2 NO. 4 STRAIGHT
BARS HORIZONTAL,
1 EACH WINGWALL

NO. 4 STRAIGHT BARS
HORIZONTAL @ 1'-0" CC
@ BOTH SIDES OF OPENING


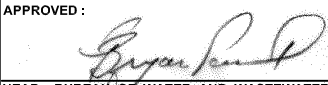



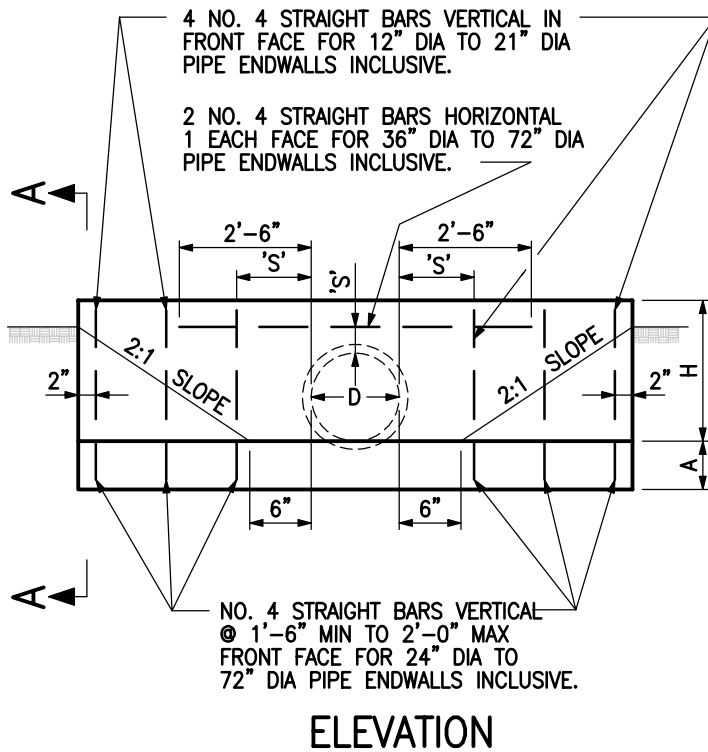
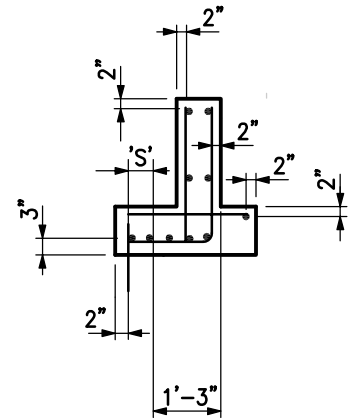
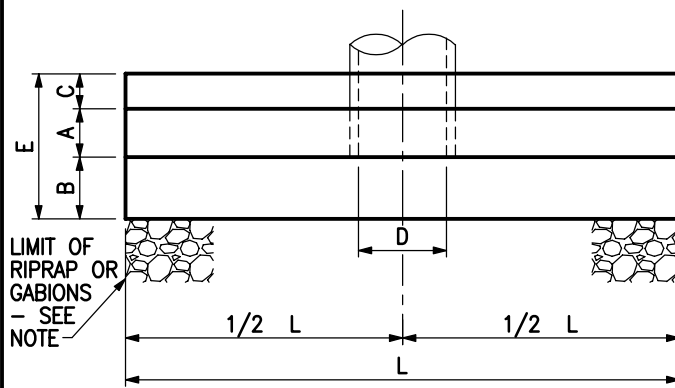
NOTES:

1. SPECIFICATIONS: LATEST DPW
2. CONCRETE SHALL BE MIX 3
3. REINFORCING: DEFORMED STEEL BARS NO. 4 AND NO. 6
4. CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED
5. SCOUR PROTECTION: FINAL LIMITS TO BE DETERMINED BY ENGINEER

OPENING		DIMENSIONS												QUANTITIES	
D INCHES	AREA SQ FT	B	C	E	F	G	H	J	K	L	M	N	O	CONC CY	STEEL LBS
48"	12.57	1'-4"	10"	3'-2"	2'-9"	7'-0 3/4"	5'-0"	4'-10"	6'-3 1/2"	6'-8 1/2"	5'-9"	2'-10 3/4"	5'-6"	4.3	262
54"	15.9	1'-8"	1'-0"	3'-8"	3'-0"	7'-8 1/2"	5'-6"	5'-4"	6'-10 1/2"	7'-3 1/2"	6'-2 1/4"	3'-1 1/2"	6'-2"	5.3	301
60"	19.64	1'-8"	1'-0"	3'-8"	3'-3"	8'-5"	6'-0"	5'-10"	7'-7 1/4"	8'-0 1/4"	6'-11"	3'-7 1/2"	6'-8"	6.0	361
66"	23.80	2'-6"	1'-3"	4'-9"	3'-0"	11'-2 1/2"	6'-8 1/2"	6'-4"	10'-3 1/4"	10'-8 1/2"	9'-3"	3'-5"	7'-4 1/2"	9.7	585
72"	28.27	2'-6"	1'-3"	4'-9"	3'-3"	12'-1"	7'-3"	6'-10"	11'-1 3/4"	11'-6 3/4"	10'-1 1/4"	3'-11"	7'-10 1/2"	10.9	645
78"	33.20	3'-0"	1'-6"	5'-6"	3'-6"	13'-0 1/2"	7'-9 1/2"	7'-4"	12'-0"	12'-5"	10'-9"	4'-0"	8'-6 3/4"	13.3	865
84"	38.48	3'-0"	1'-6"	5'-6"	3'-9"	13'-10"	8'-4"	7'-10"	12'-9 1/2"	13'-2 1/2"	11'-6 1/2"	4'-6"	9'-0 3/4"	14.7	984

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 352.02		
			SCALE: NONE		SHEET 1 OF 1



NO. 4 STRAIGHT BARS HORIZONTAL
 @ 1'-7" MAX CC BOTH FACES- TOP AND
 BOTTOM BARS TO BE FULL LENGTH-
 ALL ENDWALLS.

NO. 4 STRAIGHT BARS
 HORIZONTAL @ 1'-0"
 CC BOTH SIDES OF
 OPENING FOR 36"
 DIA TO 72" DIA PIPE
 ENDWALLS INCLUSIVE.

SEE NOTES

3'-0"
 (MIN)

GEOTEXTILE

PROVIDE RIPRAP OR
 GABIONS TO PREVENT
 SCOUR AT TOEWALL
 (COST SEPARATE)

NO. 4 BENT BARS
 @ 1'-0" CC ALL
 ENDWALLS.

1 1/2 :1 TO 4:1 SLOPE

2 NO. 4 STRAIGHT BARS
 HORIZONTAL FOR 36" DIA
 TO 72" DIA PIPE
 ENDWALLS INCLUSIVE.

1 NO. 4 STRAIGHT
 BAR HORIZONTAL-
 ALL ENDWALLS.

NOTES:

1. SPECIFICATIONS: LATEST DPW
2. CONCRETE SHALL BE MIX 3
3. REINFORCING: DEFORMED STEEL BARS NO. 4
4. CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED
5. SCOUR PROTECTION: FINAL LIMITS TO BE DETERMINED BY ENGINEER

SECTION A-A



APPROVED :

HEAD, BUREAU OF WATER AND WASTEWATER
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

TYPE 'C' ENDWALL CIRCULAR
 AND ELLIPTICAL PIPE

ISSUED

REVISED

REVISED

3 / 2008

STANDARD NO.
 BC 354.02

SCALE : NONE

SHEET 1 OF 2

OPENING		DIMENSIONS								QUANTITIES	
D	AREA	A	B	C	E	F	H	L	S	CONC CY	STEEL LBS
INCHES	SQ FT										
14 X 23	1.8	9"	8"	6"	1'-11"	12"	2'-2"	8'-7"	6"	0.88	56
19 X 30	3.3	9"	8"	6"	1'-11"	12"	2'-6"	10'-6"	6"	1.15	63
22 X 34	4.1	9"	14"	6"	2'-5"	13"	2'-11"	12'-6"	6"	1.74	100
24 X 38	5.1	9"	14"	6"	2'-5"	13"	3'-1"	13'-6"	6"	1.92	116
27 X 42	6.3	9"	14"	6"	2'-5"	13"	3'-4"	14'-10"	6"	2.19	124
29 X 45	7.4	9"	14"	10"	2'-9"	14"	3'-7"	16'-0"	8"	2.61	141
32 X 49	8.8	12"	16"	10"	3'-2"	14"	3'-10"	17'-0"	8"	4.08	202
34 X 53	10.2	12"	16"	10"	3'-2"	14"	4'-0"	18'-0"	8"	4.40	210
38 X 60	12.9	12"	16"	10"	3'-2"	15"	4'-5"	20'-4"	8"	5.23	266
43 X 68	16.6	12"	20"	12"	3'-8"	15"	4'-10"	22'-8"	8"	6.52	307


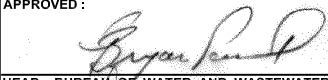
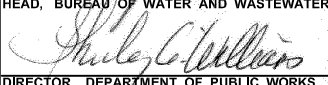
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

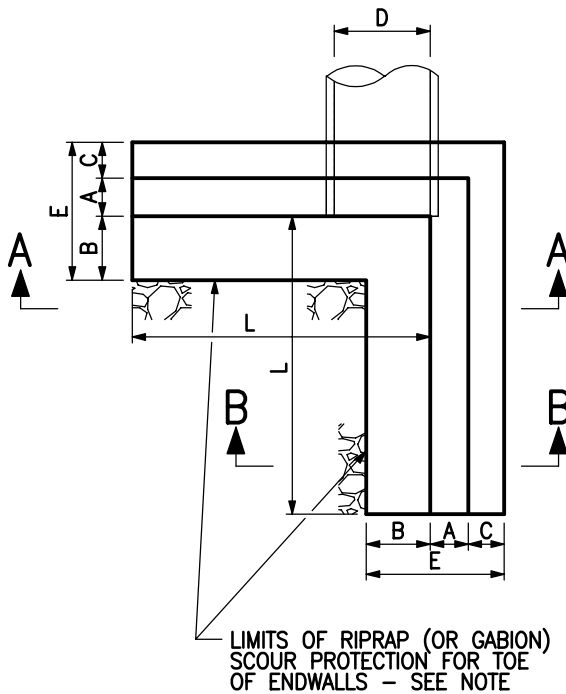
HORIZONTAL ELLIPTICAL CONCRETE PIPE

OPENING		DIMENSIONS								QUANTITIES	
D	AREA	A	B	C	E	F	H	L	S	CONC CY	STEEL LBS
INCHES	SQ FT										
12	0.79	9"	6"	6"	1'-9"	9"	1'-9"	6'-6"	4"	0.61	41
15	1.23	9"	6"	6"	1'-9"	9"	2'-0"	7'-9"	4"	0.77	47
18	1.77	9"	6"	6"	1'-9"	9"	2'-3"	9'-0"	4"	0.95	54
21	2.40	9"	6"	6"	1'-9"	9"	2'-6"	10'-3"	4"	1.14	70
24	3.14	9"	14"	6"	2'-5"	9"	2'-9"	11'-6"	6"	1.56	80
27	3.98	9"	14"	6"	2'-5"	9"	3'-0"	12'-10"	6"	1.82	88
30	4.91	9"	14"	6"	2'-5"	12"	3'-6"	14'-2"	6"	2.22	98
33	5.94	9"	14"	6"	2'-5"	12"	3'-9"	15'-5"	6"	2.48	105
36	7.07	12"	16"	10"	3'-2"	12"	4'-0"	16'-8"	6"	4.16	182
42	9.62	12"	16"	10"	3'-2"	12"	4'-6"	19'-2"	8"	5.07	206
48	12.57	12"	16"	10"	3'-2"	12"	5'-0"	21'-8"	8"	6.09	244
54	15.90	12"	20"	12"	3'-8"	12"	5'-6"	24'-2"	8"	7.62	275
60	19.64	12"	20"	12"	3'-8"	12"	6'-0"	26'-8"	8"	8.82	304
72	28.27	12"	20"	12"	3'-8"	12"	7'-0"	31'-8"	8"	11.46	377

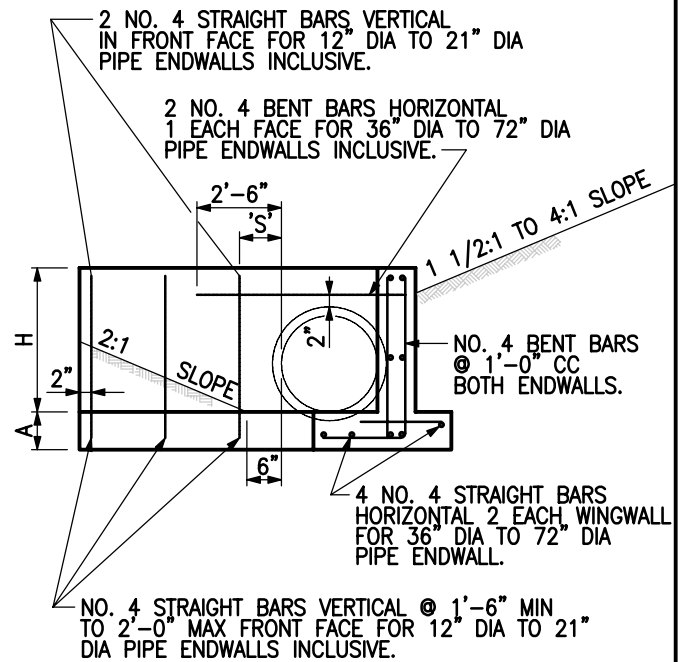
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

CIRCULAR REINFORCED CONCRETE PIPE

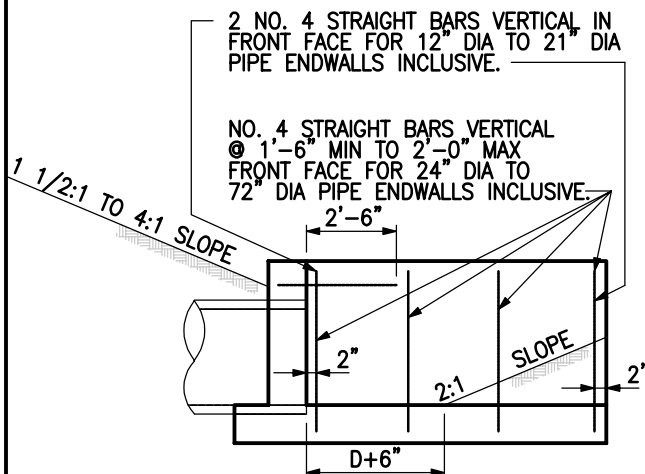
	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 354.02		
		TYPE 'C' ENDWALL CIRCULAR AND ELLIPTICAL PIPE TABLES	SCALE : NONE		SHEET 2 OF 2



PLAN



SECTION A-A



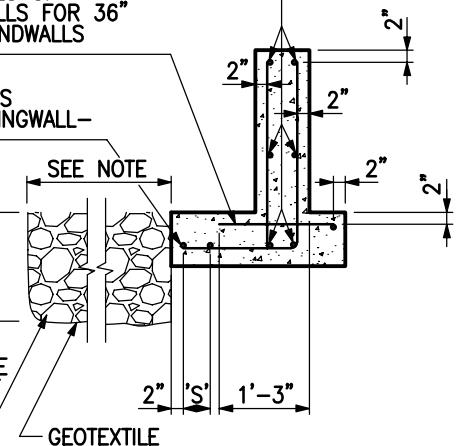
END VIEW

NO. 4 STRAIGHT BARS HORIZONTAL @ 1'-7" MAX CC BOTH FACES-LAP 1'-3" TOP AND BOTTOM BARS @ CORNER-BOTH WINGWALLS-ALL ENDWALLS.

NO. 4 STRAIGHT BARS HORIZONTAL @ 1'-0" CC BOTH SIDES OF OPENING BOTH WINGWALLS FOR 36" DIA TO 72" DIA PIPE ENDWALLS INCLUSIVE.

2 NO. 4 STRAIGHT BARS HORIZONTAL 1 EACH WINGWALL-ALL ENDWALLS.

PROVIDE RIPRAP OR GABIONS ON GEOTEXTILE TO PREVENT SCOUR OF ENDWALL.



SECTION B-B

NOTES:

1. SPECIFICATIONS: LATEST DPW
2. CONCRETE SHALL BE MIX 3
3. REINFORCING: DEFORMED STEEL BARS NO. 4
4. CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED.
5. SCOUR PROTECTION: FINAL LIMITS TO BE DETERMINED BY ENGINEER.



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

TYPE 'E' ENDWALL CIRCULAR
 AND ELLIPTICAL PIPE

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 356.02

SCALE : NONE

SHEET 1 OF 2

OPENING		DIMENSIONS							QUANTITIES	
D	AREA	A	B	C	E	H	L	C	CONC CY	STEEL LBS
INCHES	SQ FT									
14 X 23	1.81	9"	6"	6"	1'-9"	2'-2"	5'-10"	6"	1.30	75
19 X 30	3.32	9"	14"	6"	2'-5"	3'-2"	8'-6"	6"	2.60	118
22 X 34	5.10	9"	14"	6"	2'-5"	3'-2"	8'-6"	6"	2.57	118
27 X 42	7.42	9"	16"	10"	3'-2"	3'-6"	11'-3"	6"	5.50	265
32 X 49	8.86	12"	16"	10"	3'-2"	3'-11"	11'-3"	8"	5.80	271
34 X 53	10.23	12"	16"	10"	3'-2"	3'-11"	11'-3"	8"	5.65	261
38 X 60	12.92	12"	20"	12"	3'-2"	4'-3"	13'-9"	8"	8.12	366


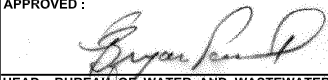
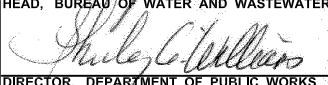
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

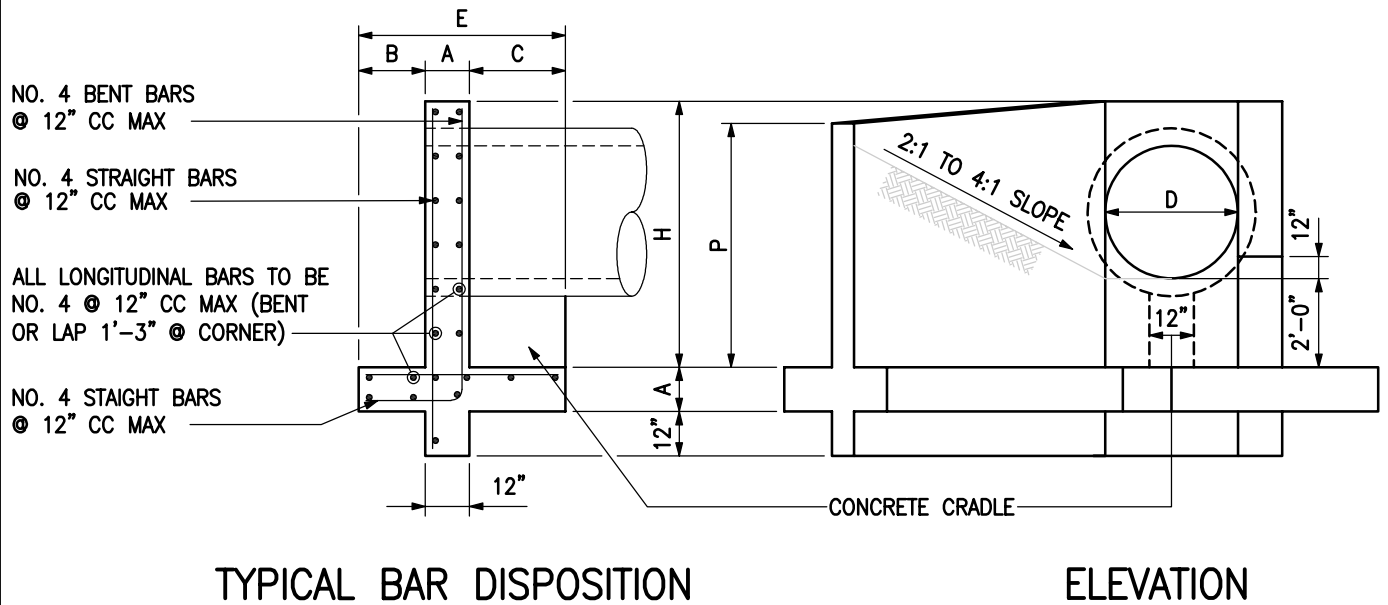
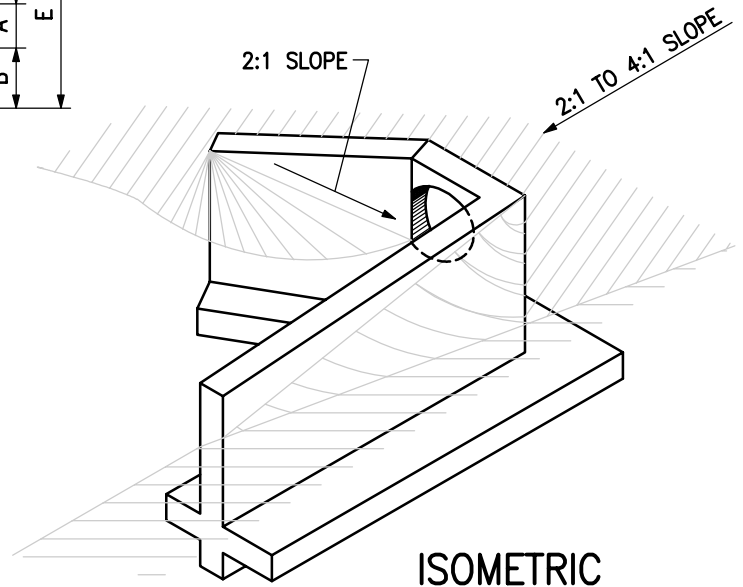
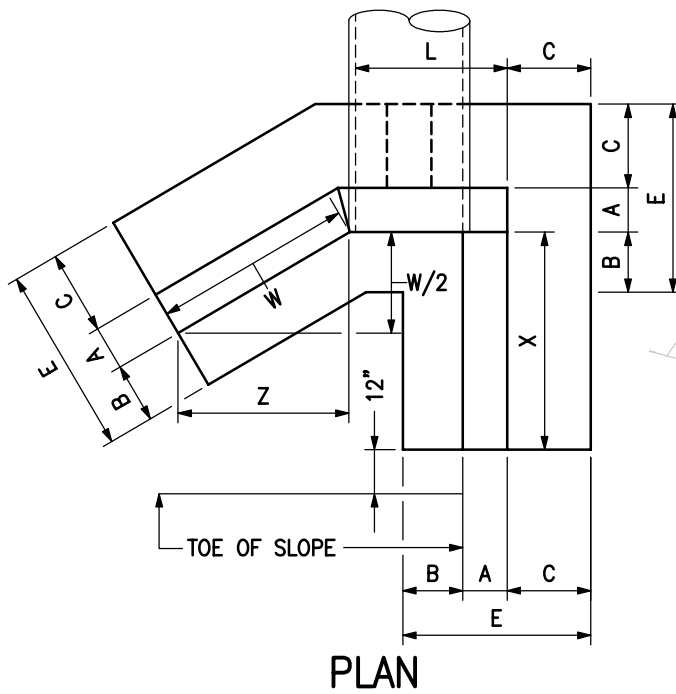
HORIZONTAL ELLIPTICAL REINFORCED CONCRETE PIPE

OPENING		DIMENSIONS							QUANTITIES	
D	AREA	A	B	C	E	H	L	S	CONC CY	STEEL LBS
INCHES	SQ FT									
12	0.79	9"	6"	6"	1'-9"	1'-9"	3'-6"	4"	0.76	55
15	1.23	9"	6"	6"	1'-9"	2'-0"	4'-3"	4"	0.99	61
18	1.77	9"	6"	6"	1'-9"	2'-3"	5'-0"	4"	1.17	68
21	2.40	9"	6"	6"	1'-9"	2'-6"	5'-9"	4"	1.38	77
24	3.14	9"	14"	6"	2'-5"	2'-9"	6'-6"	4"	1.84	106
27	3.98	9"	14"	6"	2'-5"	3'-0"	7'-3"	6"	2.11	115
30	4.91	9"	14"	6"	2'-5"	3'-6"	8'-0"	6"	2.57	140
33	5.94	9"	14"	6"	2'-5"	3'-9"	8'-9"	6"	2.92	148
36	7.07	12"	16"	10'	3'-2"	4'-0"	9'-6"	6"	4.99	235
42	9.62	12"	16"	10"	3'-2"	4'-6"	11'-0"	8"	6.12	303
48	12.57	12"	16"	10"	3'-2"	5'-0"	12'-6"	8"	7.34	341
54	15.90	12"	20"	12"	3'-8"	5'-6"	14'-0"	8"	9.17	438
60	19.64	12"	20"	12"	3'-8"	6'-0"	15'-6"	8"	10.86	496
72	28.27	12"	20"	12"	3'-8"	7'-0"	17'-0"	8"	12.69	597

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

CIRCULAR REINFORCED CONCRETE PIPE

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 356.02		
			SCALE : NONE		SHEET 2 OF 2



NOTES:

1. SPECIFICATIONS: LATEST DPW
2. CONCRETE: SHALL BE MIX 3
3. REINFORCING: DEFORMED STEEL BARS
4. CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED
5. COVER: MINIMUM COVER TO BE 2" UNLESS OTHERWISE NOTED



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

TYPE 'F' ENDWALL CIRCULAR
 AND ELLIPTICAL PIPE

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 358.02		
SCALE : NONE		SHEET 1 OF 2

OPENING		DIMENSIONS										QUANTITIES	
D	AREA	A	B	C	E	L	H	W	X	Z	P	CONC	STEEL
INCHES	SQ. FT											CY	LBS
15	1.23	12"	1'-0"	1'-6"	3'-6"	2'-0"	4'-0"	3'-0"	5'-0"	2'-7"	3'-5"	3.13	228
18	1.78	12"	1'-3"	1'-10"	4'-1"	2'-3"	4'-0"	3'-6"	6'-0"	3'-0"	3'-7"	3.99	284
21	2.41	12"	1'-3"	1'-10"	4'-1"	2'-7"	4'-3"	4'-0"	7'-0"	3'-6"	3'-11"	4.66	322
24	3.14	12"	1'-3"	1'-10"	4'-1"	3'-0"	4'-6"	4'-6"	8'-0"	3'-11"	4'-2"	5.35	367
27	4.42	12"	1'-3"	1'-10"	4'-1"	3'-3"	4'-10"	5'-0"	9'-2"	4'-4"	4'-5"	6.09	408
30	4.91	12"	1'-6"	2'-2"	4'-8"	3'-6"	5'-1"	5'-6"	10'-4"	4'-9"	4'-7"	7.37	517
33	6.60	12"	1'-6"	2'-2"	4'-8"	3'-9"	5'-6"	6'-0"	11'-4"	5'-4"	4'-10"	8.03	561
36	7.07	12"	1'-6"	2'-2"	4'-8"	4'-0"	6'-0"	6'-6"	12'-4"	5'-8"	5'-0"	8.76	620
42	9.62	12"	1'-10"	2'-2"	5'-4"	4'-6"	6'-6"	7'-6"	14'-8"	6'-6"	5'-5"	11.20	765
48	12.57	12"	1'-10"	2'-6"	5'-4"	5'-0"	6'-8"	8'-3"	16'-8"	7'-2"	5'-10"	12.95	841


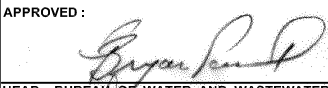
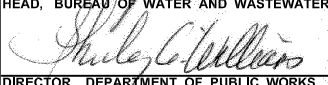
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

TYPE 'F' ENDWALL 2:1 SLOPE

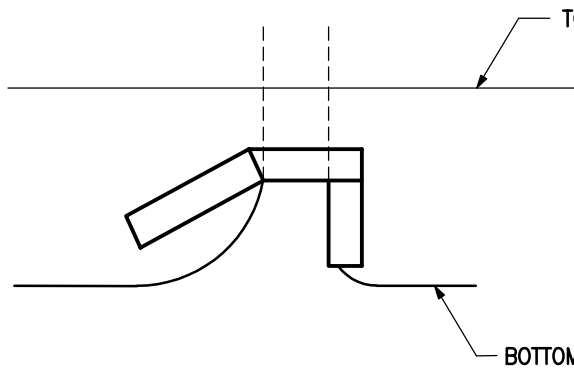
OPENING		DIMENSIONS										QUANTITIES	
D	AREA	A	B	C	E	L	H	W	X	Z	P	CONC	STEEL
INCHES	SQ. FT											CY	LBS
15	1.23	12"	1'-0"	1'-6"	3'-6"	2'-0"	3'-11"	2'-6"	2'-6"	2'-2"	3'-5"	2.30	186
18	1.78	12"	1'-3"	1'-10"	4'-1"	2'-3"	4'-2"	3'-0"	3'-0"	2'-7"	3'-7"	2.94	213
21	2.41	12"	1'-3"	1'-10"	4'-1"	2'-7"	4'-6"	3'-6"	3'-6"	3'-0"	3'-10"	3.44	260
24	3.14	12"	1'-3"	1'-10"	4'-1"	3'-0"	4'-9"	4'-0"	4'-0"	3'-5"	4'-1"	3.96	285
27	4.42	12"	1'-3"	1'-10"	4'-1"	3'-3"	5'-0"	4'-4"	4'-7"	3'-9"	4'-4"	4.41	310
30	4.91	12"	1'-6"	2'-2"	4'-8"	3'-6"	5'-4"	4'-8"	5'-2"	4'-1"	4'-6"	5.23	395
33	6.60	12"	1'-6"	2'-2"	4'-8"	3'-9"	5'-7"	5'-0"	5'-8"	4'-4"	4'-8"	5.70	431
36	7.07	12"	1'-6"	2'-2"	4'-8"	4'-0"	5'-10"	5'-4"	6'-2"	4'-7"	4'-10"	6.15	455
42	9.62	12"	1'-10"	2'-2"	5'-4"	4'-6"	6'-5"	6'-4"	7'-4"	5'-6"	5'-2"	7.86	538
48	12.57	12"	1'-10"	2'-6"	5'-4"	5'-0"	6'-11"	7'-0"	8'-4"	6'-1"	5'-6"	8.92	614

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

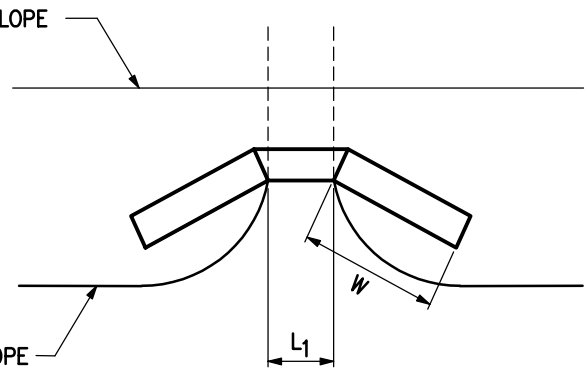
TYPE 'F' ENDWALL 4:1 SLOPE

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 358.02		
		TYPE 'F' ENDWALL CIRCULAR AND ELLIPTICAL PIPE TABLES	SCALE : NONE		SHEET 2 OF 2

CASE 1

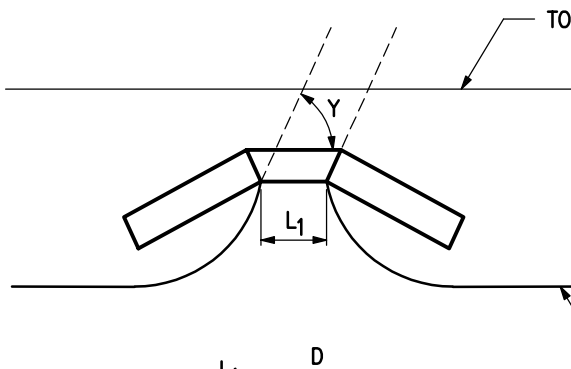


CASE 2



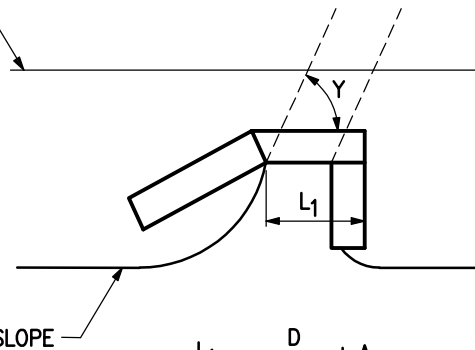
$$L_1 = D$$

CASE 3



$$L_1 = \frac{D}{\sin Y}$$

CASE 4



$$L_1 = \frac{D}{\sin Y} + A$$

NOTES:

- CASE 1. THIS CONDITION IS COVERED BY THE STANDARD TYPE 'F' ENDWALL.
- CASE 2. WHEN A WATER COURSE IS PERPENDICULAR OR ASKEW TO THE CENTERLINE, AND THE SIDE DITCH DRAINAGE IS IN BOTH DIRECTIONS AND IT IS MORE ECONOMICAL OR BETTER PRACTICE TO PLACE THE PIPE AT RIGHT ANGLES TO THE CENTERLINE, THE 'F' ENDWALL CAN BE USED BY MAKING THE SHORTER WING EQUAL IN LENGTH AND ANGLE TO THE LONGER WING.
- CASE 3. WHEN THE DRAINAGE CONDITIONS ARE SIMILAR TO CASE 2 BUT IT IS DESIRED TO PLACE THE PIPE ASKEW, THE 'F' ENDWALL CAN BE USED. THE WINGS WILL BE PLACED THE SAME AS CASE 2, BUT THE LENGTH OF THE HEADWALL WILL BE INCREASED DUE TO THE INCREASED AREA OF THE PIPE.
- CASE 4. WHEN A PIPE IS PLACED ASKEW TO FOLLOW THE NATURAL WATER COURSE AND THE SIDE DITCH DRAINAGE IS IN ONE DIRECTION, THE 'F' ENDWALL WILL BE USED WITH THE EXCEPTION THAT THE HEADWALL WILL BE LENGTHENED DUE TO THE INCREASE AREA OF THE PIPE.



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STANDARD TYPE 'F' ENDWALL
 MODIFICATIONS

ISSUED

REVISED

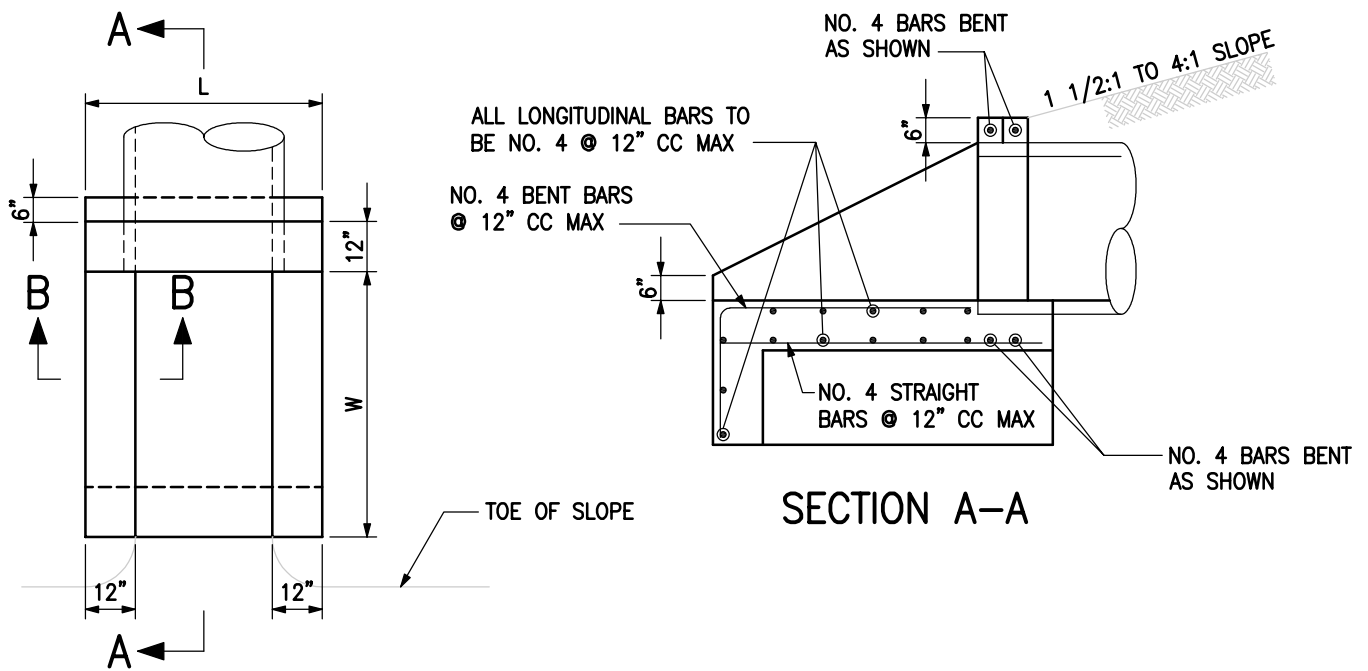
REVISED

3 / 2008

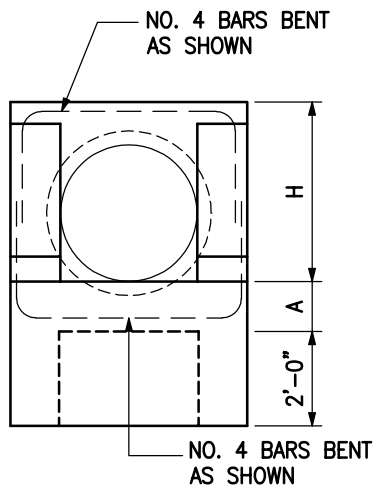
STANDARD NO.
 BC 358.91

SCALE : NONE

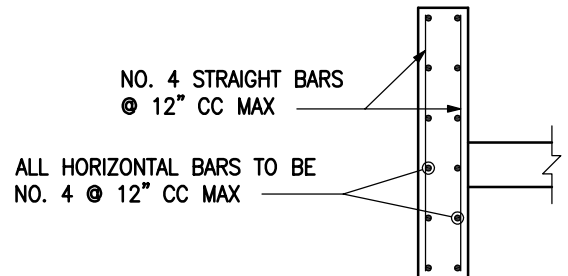
SHEET 1 OF 1



PLAN



ELEVATION




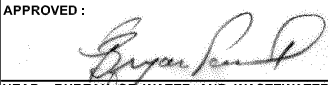

SECTION B-B

OPENING		DIMENSIONS				QUANTITIES	
D	AREA	A	H	L	W	CONC	STEEL
INCHES	SQ. FT.					CY	LBS.
15	1.23	12"	1'-11"	3'-3"	1'-10"	1.27	110
18	1.78	12"	2'-2"	3'-6"	2'-6"	1.60	144
21	2.41	12"	2'-6"	3'-9"	3'-0"	1.90	162
24	3.14	12"	2'-9"	4'-0"	3'-6"	2.21	186
27	4.42	12"	3'-0"	4'-3"	4'-0"	2.54	206
30	4.91	12"	3'-4"	4'-6"	4'-8"	2.98	245
33	6.60	12"	3'-7"	4'-9"	5'-4"	3.42	276
36	7.07	12"	3'-10"	5'-0"	5'-8"	3.74	301
42	9.62	12"	4'-5"	5'-6"	6'-10"	4.53	378
48	12.57	12"	4'-11"	6'-0"	7'-10"	5.59	448

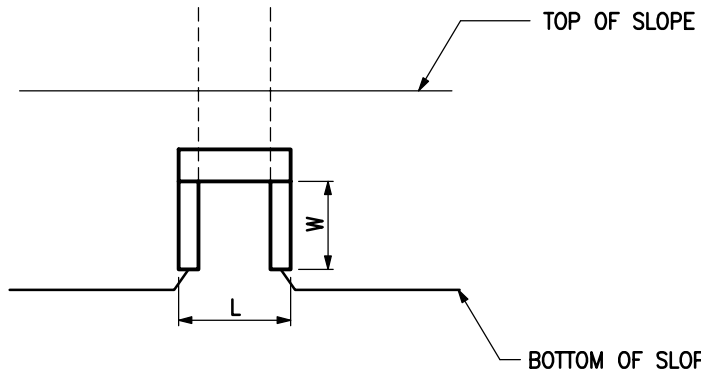
NOTES:

1. SPECIFICATIONS: LATEST DPW
2. CONCRETE: SHALL BE MIX 3
3. REINFORCING: DEFORMED STEEL BARS
4. CHAMFER: ALL EXPOSED EDGES 1"x1" OR AS DIRECTED
5. COVER: MINIMUM COVER TO BE 2" UNLESS OTHERWISE NOTED

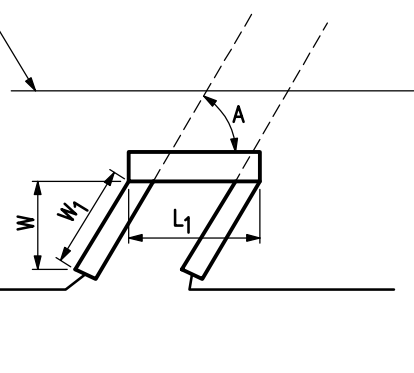
NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 360.02		
		TYPE 'G' ENDWALL CIRCULAR AND ELLIPTICAL PIPE	SCALE: NONE		SHEET 1 OF 1

CASE 1



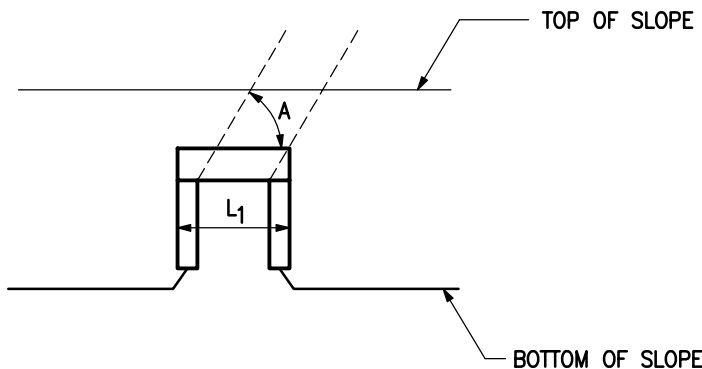
CASE 2



$$L_1 = \frac{D + 2K_1}{\sin A}$$

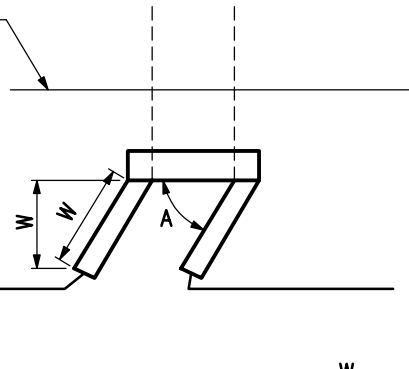
$$W_1 = \frac{W}{\sin A}$$

CASE 3



$$L_1 = \frac{D}{\sin A} + 2K_1$$

CASE 4



$$W_1 = \frac{W}{\sin A}$$

$$A = 60^\circ \text{ TO } 90^\circ$$

NOTES:

- CASE 1. THIS CONDITION IS COVERED BY THE STANDARD TYPE 'G' ENDWALL.
- CASE 2. WHEN A PIPE IS TO BE PLACED ASKEW TO FOLLOW THE NATURAL WATER COURSE, THE STANDARD 'G' ENDWALL SHOULD BE MODIFIED BY LENGTHENING THE HEADWALL TO ALLOW FOR THE INCREASED AREA OF THE PIPE DUE TO THE ASKEW AND THE WINGS LENGTHENED TO CARE FOR THE SLOPE.
- CASE 3. WHEN IT IS NOT PRACTICAL TO PLACE THE ENDWALL ON THE OUTLET END IN LINE WITH THE ENDWALL ON THE INLET END, IT IS NECESSARY TO ASKEW THE PIPE. THIS REQUIRES THE LENGTHENING OF THE HEADWALL ONLY TO ALLOW FOR THE INCREASED AREA OF THE PIPE DUE TO THE ASKEW. THE LENGTH OF THE WINGS ARE STANDARD.
- CASE 4. WHEN A WATER COURSE IS ASKEW AND IT IS MORE ECONOMICAL OR BETTER PRACTICE TO PLACE THE PIPE AT RIGHT ANGLES TO THE CENTER LINE AND RECUT THE OUTLET, THE 'G' ENDWALL CAN BE USED BY PLACING THE WINGS PARALLEL TO THE COURSE AND LENGTHENING THE WINGWALLS ONLY, THE HEADWALL REMAINS STANDARD.



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 BUREAU OF WATER AND WASTEWATER

STANDARD TYPE 'G' ENDWALL
 MODIFICATIONS

ISSUED

REVISED

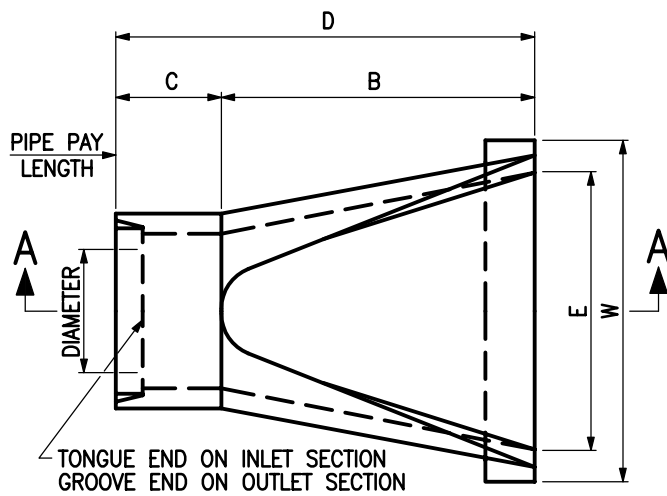
REVISED

3 / 2008

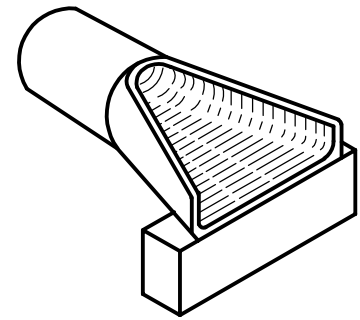
STANDARD NO.
 BC 360.91

SCALE : NONE

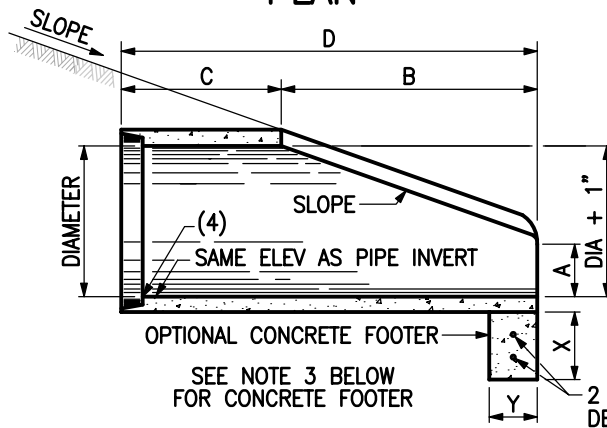
SHEET 1 OF 1



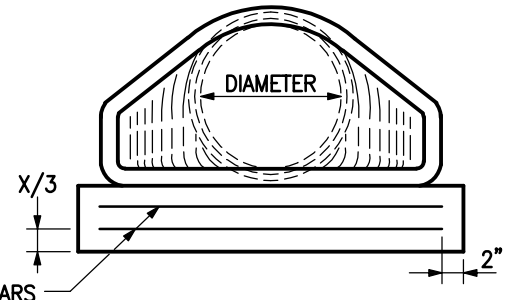
PLAN



ISOMETRIC VIEW



SECTION A-A




END VIEW

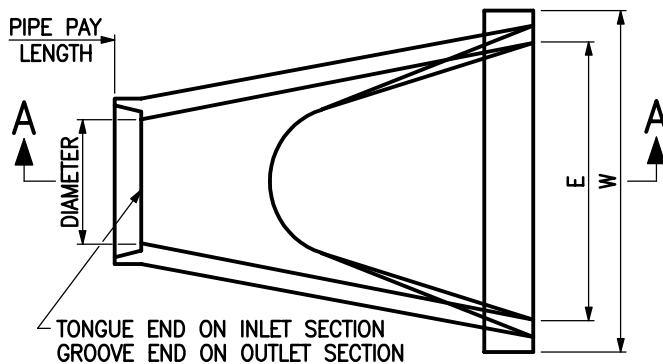
NOTES:

1. CONTRACTOR HAS OPTION OF FURNISHING END SECTIONS CONFORMING TO DETAILS ON THIS SHEET OR END SECTIONS CONFORMING TO DETAILS ON STANDARD BC 368.02.
2. END SECTIONS MUST BE REINFORCED TO CONFORM WITH CLASS IV PIPE.
3. CONCRETE FOOTER SHALL BE USED WHEN SPECIFIED ON THE PLANS. COST OF CONCRETE FOOTER TO BE INCLUDED IN PRICE OF END SECTION. CONCRETE TO BE MIX 2. REINFORCEMENT TO BE NO. 3 BARS.
4. INVERT ELEVATION TO BE AT THE PIPE END OF THE STANDARD END SECTION. ELEVATIONS TO BE NOTED ON THE CONSTRUCTION PLANS.

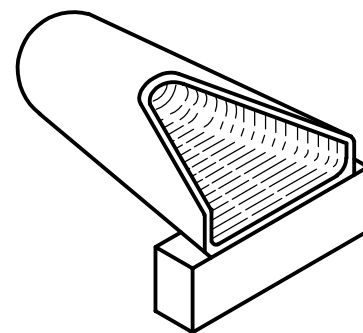
CONCRETE END SECTION							CONCRETE FOOTER				
DIMENSIONS							DIMENSIONS			QUANTITIES	
D INCHES	SLOPE	A	B	C	D	E	W	X	Y	CONC CY	STEEL LBS
12	3:1	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	3'-0"	12"	9"	0.08	24.00
15	3:1	6"	2'-3"	3'-10"	6'-1"	2'-6"	3'-6"	12"	9"	0.10	28.50
18	3:1	9"	2'-3"	3'-10"	6'-1"	3'-0"	4'-0"	12"	9"	0.11	33.00
21	3:1	9"	3'-0"	3'-1 1/2"	6'-1 1/2"	3'-6"	4'-6"	12"	9"	0.13	37.50
24	3:1	9 1/2"	3'-7 1/2"	2'-6"	6'-1 1/2"	4'-0"	5'-0"	15"	9"	0.17	42.00
27	3:1	10 1/2"	4'-1 1/2"	2'-0"	6'-1 1/2"	4'-6"	5'-6"	15"	9"	0.19	46.50
30	3:1	1'-0"	4'-6"	1'-7 3/4"	6'-1 3/4"	5'-0"	6'-0"	15"	9"	0.21	51.00
33	3:1	1'-2"	4'-7"	2'-2"	6'-9"	5'-6"	6'-6"	15"	9"	0.23	55.50
36	3:1	1'-3"	5'-3"	2'-10 3/4"	8'-1 3/4"	6'-0"	7'-3"	15"	9"	0.25	62.25
42	3:1	1'-6" OR 1'-9"	5'-3"	2'-11"	8'-2"	6'-6"	7'-9"	15"	9"	0.27	66.75
48	3:1	2'-0"	6'-0"	2'-2"	8'-2"	7'-0"	8'-6"	18"	12"	0.47	73.50
54	2.4:1	2'-3"	5'-5"	2'-9 1/4"	8'-2 1/4"	7'-6"	9'-0"	18"	12"	0.50	78.00

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

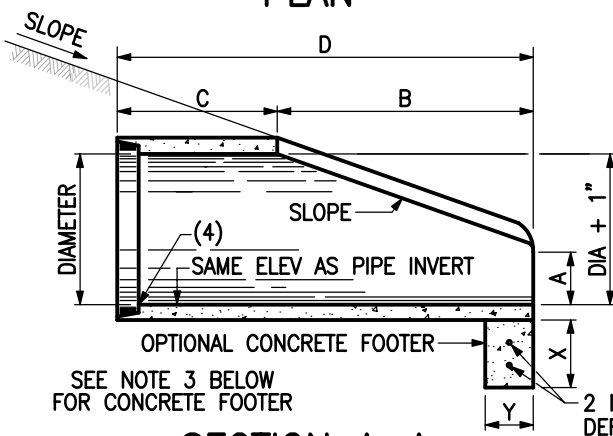
	APPROVED :	<p align="center">CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER</p>	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS		<p align="center">STANDARD NO. BC 368.01</p>		
			SCALE : NONE		SHEET 1 OF 1



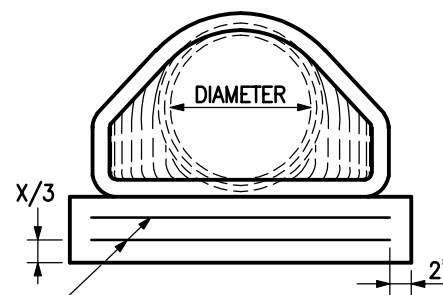
PLAN



ISOMETRIC VIEW



SECTION A-A



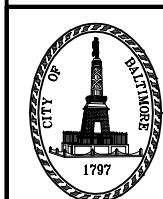
END VIEW

NOTES:

1. CONTRACTOR HAS OPTION OF FURNISHING END SECTIONS CONFORMING TO DETAILS ON THIS SHEET OR END SECTIONS CONFORMING TO DETAILS ON STANDARD BC 368.01.
2. END SECTIONS MUST BE REINFORCED TO CONFIRM WITH CLASS IV PIPE.
3. CONCRETE FOOTER SHALL BE USED WHEN SPECIFIED ON THE PLANS. COST OF CONCRETE FOOTER TO BE INCLUDED IN PRICE OF END SECTION. CONCRETE TO BE MIX 2. REINFORCEMENT TO BE NO. 3 BARS.
4. INVERT ELEVATION TO BE AT THE PIPE END OF THE STANDARD END SECTION. ELEVATIONS TO BE NOTED ON THE CONSTRUCTION PLANS.

CONCRETE END SECTION							CONCRETE FOOTER					
DIMENSIONS							DIMENSIONS			QUANTITIES		
D INCHES	SLOPE	A	B	C	D	E	W	X	Y	CONC CY	STEEL LBS	
12	3:1	4"	2'-0"	4'-0 7/8"	6'-0 7/8"	2'-0"	3'-0"	12"	9"	0.08	24.00	
15	3:1	6 1/2"	2'-4"	3'-10"	6'-2"	2'-6"	3'-6"	12"	9"	0.10	28.50	
18	3:1	10 1/4"	2'-2"	4'-0"	6'-2"	3'-0"	4'-0"	12"	9"	0.11	33.00	
21	3:1	9"	3'-0"	3'-1 1/2"	6'-1 1/2"	3'-6"	4'-6"	12"	9"	0.13	37.50	
24	3:1	11"	3'-7"	2'-8"	6'-3"	4'-0"	5'-0"	15"	9"	0.17	42.00	
27	3:1	10 1/2"	4'-1 1/2"	2'-0"	6'-1 1/2"	4'-6"	5'-6"	15"	9"	0.19	46.50	
30	3:1	1'-1"	4'-5"	1'-10"	6'-3"	5'-0"	6'-0"	15"	9"	0.21	51.00	
33	3:1	1'-2"	4'-7"	2'-2"	6'-9"	5'-6"	6'-6"	15"	9"	0.23	55.50	
36	3:1	1'-3 1/2"	5'-3"	3'-1"	8'-1 1/2"	6'-0"	7'-3"	15"	9"	0.25	62.25	
42	3:1	1'-9 1/4"	5'-5"	2'-10"	8'-3"	6'-6"	7'-9"	15"	9"	0.27	66.75	
48	3:1	2'-1"	6'-0"	2'-2"	8'-2"	7'-0"	8'-6"	18"	12"	0.47	73.50	
54	2.4:1	2'-5"	5'-2"	2'-10"	8'-0"	7'-6"	9'-0"	18"	12"	0.50	78.00	

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY



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CONCRETE END SECTION
CIRCULAR PIPE
OPTION NO. 2

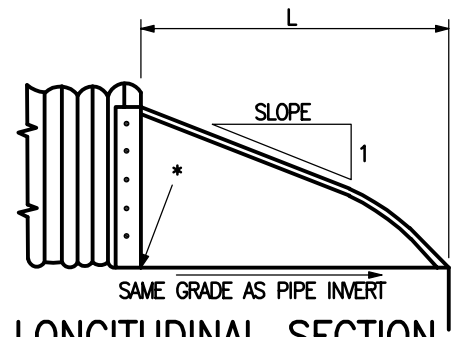
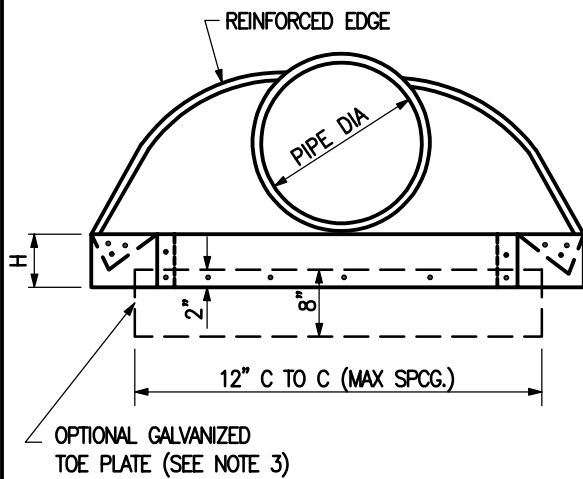
ISSUED REVISED REVISED

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STANDARD NO.
BC 368.02

SCALE : NONE

SHEET 1 OF 1



LONGITUDINAL SECTION

* INVERT ELEVATION TO BE AT THE PIPE END OF THE STANDARD END SECTION. ELEVATIONS TO BE NOTED ON CONSTRUCTION PLANS.

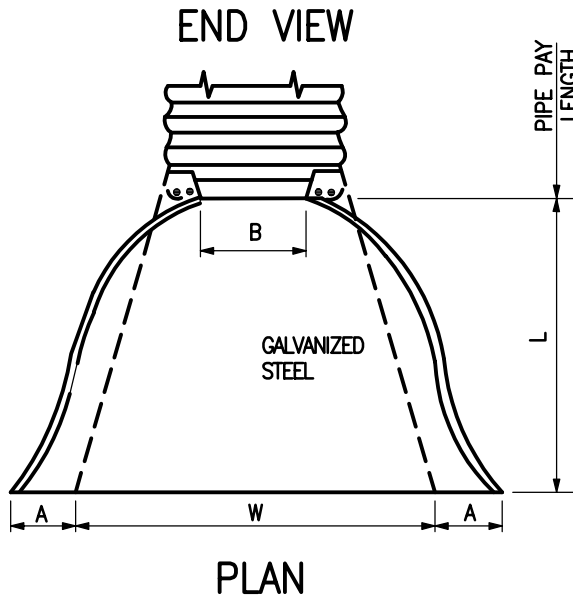


TABLE OF DIMENSIONS								
PIPE DIA	GA	A 1" ±	B MAX	H 1" ±	L 1 1/2" ±	W 2" ±	APPROX SLOPE	BODY
12"	16	6"	6"	6"	21"	24"	2 1/2	1 PC
15"	16	7"	8"	6"	26"	30"	2 1/2	1 PC
18"	16	8"	10"	6"	31"	36"	2 1/2	1 PC
21"	16	9"	12"	6"	36"	42"	2 1/2	1 PC
24"	16	10"	13"	6"	41"	48"	2 1/2	1 PC
30"	14	12"	16"	8"	51"	60"	2 1/2	1 PC
36"	14	14"	19"	9"	60"	72"	2 1/2	2 PC
42"	12	16"	22"	11"	69"	84"	2 1/2	2 PC
48"	12	18"	27"	12"	78"	90"	2 1/4	2 PC
54"	12	18"	30"	12"	84"	102"	2	2 PC
60"	12	18"	33"	12"	87"	114"	1 3/4	3 PC
66"	12	18"	36"	12"	87"	120"	1 1/2	3 PC
72"	12	18"	39"	12"	87"	126"	1 1/3	3 PC
78"	12	18"	42"	12"	87"	132"	1 1/4	3 PC
84"	12	18"	45"	12"	87"	138"	1 1/6	3 PC

NOTES:

- ALL 3 PIECE BODIES TO HAVE 12 GA SIDES AND 10 GA CENTER PANELS WIDTH OF CENTER PANELS TO BE GREATER THAN 20% OF THE PIPE PERIPHERY MULTIPLE PANEL BODIES TO HAVE LAP SEAMS WHICH ARE TO BE TIGHTLY JOINED BY 3/8" Ø GALVANIZED RIVETS OR BOLTS.
- FOR 60" THRU 84" SIZES, REINFORCED EDGES TO BE SUPPLEMENTED WITH GALVANIZED STIFFENER ANGLES. THE ANGLES WILL BE 2"x2"x1/4" FOR 60" THRU 72" DIAMETER AND 2 1/2"x2 1/2"x1/4" FOR 78" AND 84" DIAMETER. THE ANGLES TO BE ATTACHED BY 3/8" Ø GALVANIZED NUTS AND BOLTS.
- TOE PLATE SHALL BE USED WHEN SPECIFIED ON THE PLANS. COST OF TOE PLATE TO BE INCLUDED IN BID PRICE PER EACH OF METAL END SECTION.
- TYPE 3 CONNECTION INCLUDES ONE FOOT OF PIPE LENGTH FOR 42" THRU 84" DIAMETER AS A CONNECTOR SECTION. THE CONNECTOR SECTION WILL BE ATTACHED TO THE END SECTION BY GALVANIZED RIVETS OR BOLTS.



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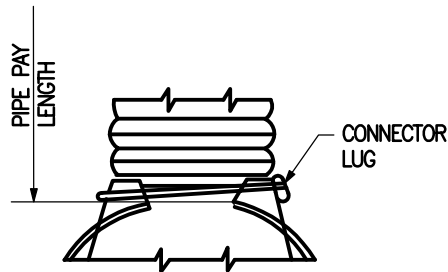
CITY OF BALTIMORE
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METAL END SECTION
 CIRCULAR PIPE

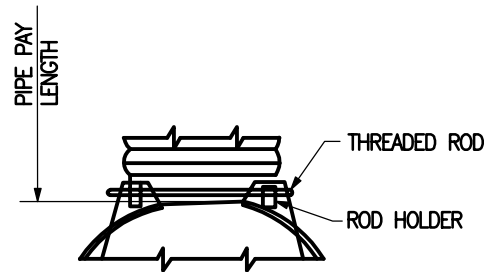
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 370.02

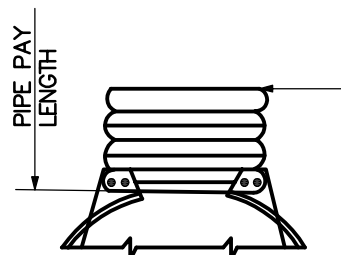
SCALE : NONE SHEET 1 OF 2



TYPE 1
FOR 12" THRU 24" ONLY




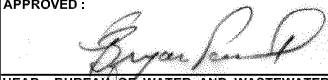
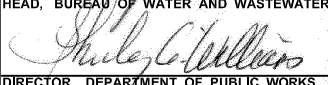
TYPE 2
FOR 30" THRU 36" ONLY

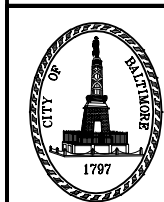
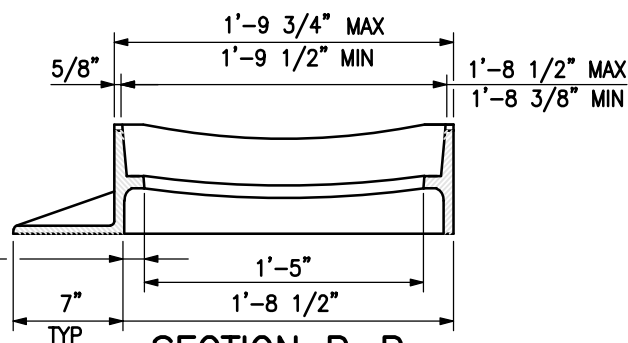
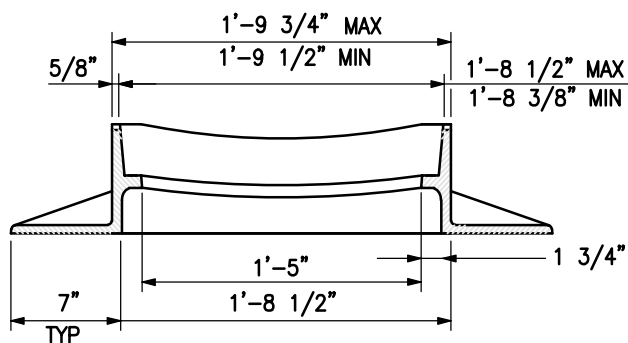
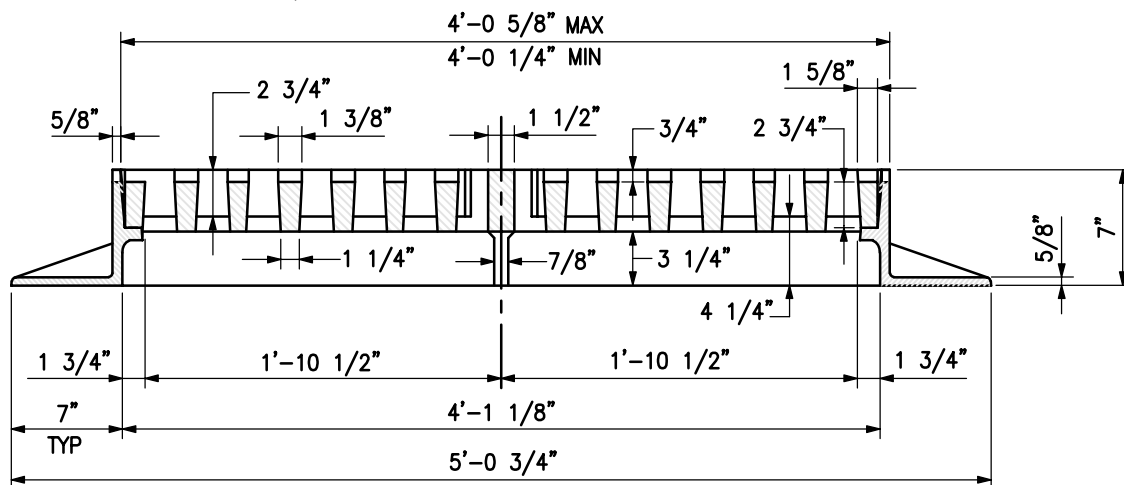
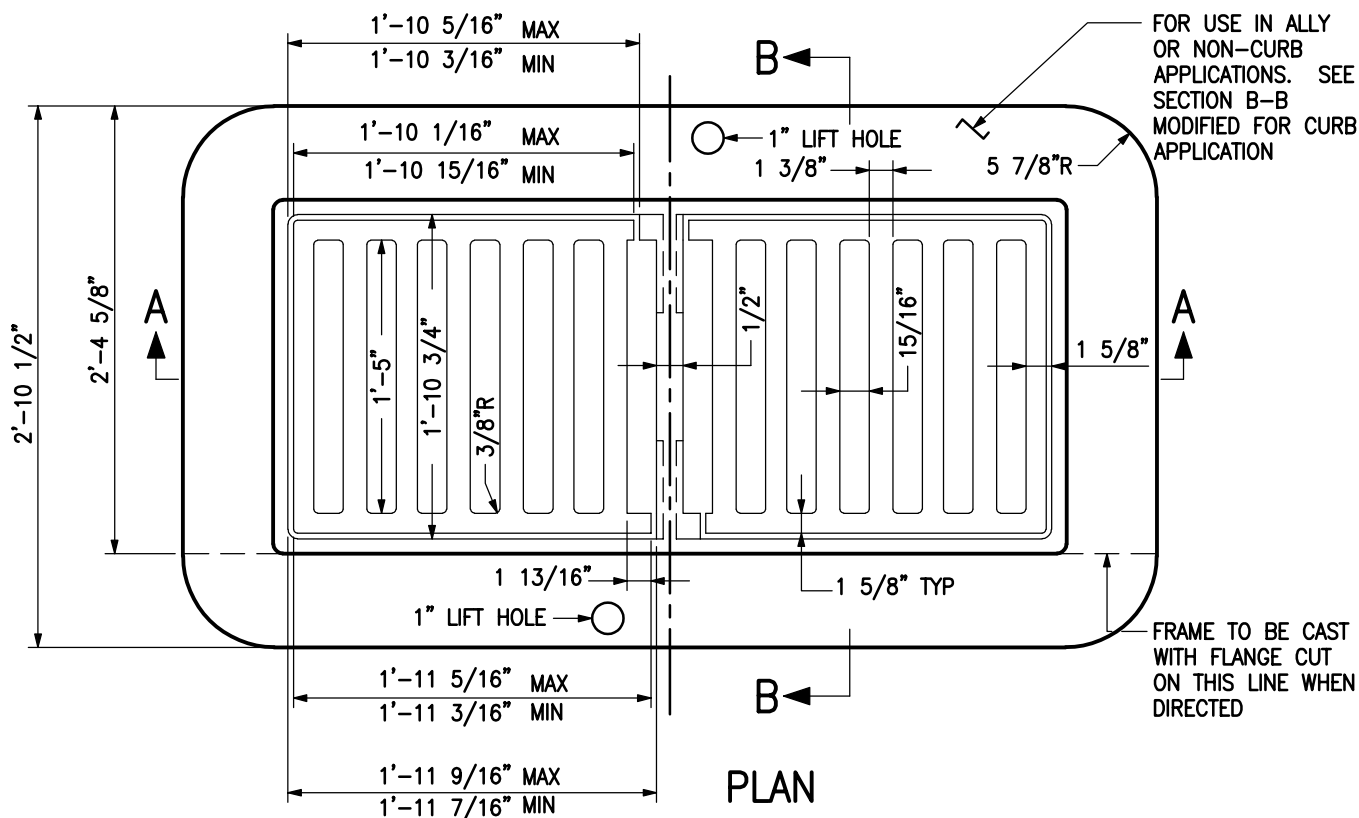


INCLUDES ONE FOOT OF PIPE LENGTH AS A CONNECTOR SECTION. THE CONNECTOR SECTION WILL BE ATTACHED TO THE END SECTION BY GALVANIZED RIVETS OR BOLTS.

TYPE 3
FOR 42" THRU 84" ONLY

CONNECTIONS FOR CIRCULAR PIPE

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 370.02		
			SCALE : NONE	SHEET 2 OF 2	



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

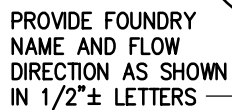
TYPE NO. 1 'E'
 GRATE(S) AND FRAME

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 376.01

SCALE : NONE

SHEET 1 OF 1



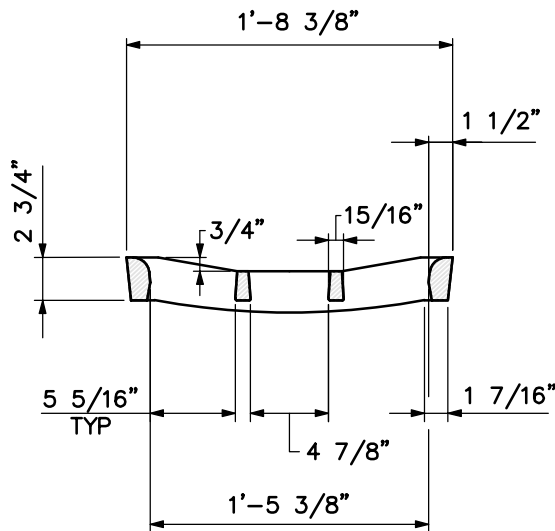
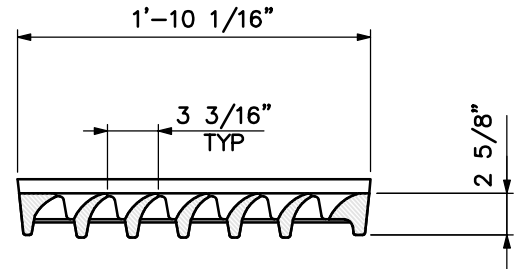
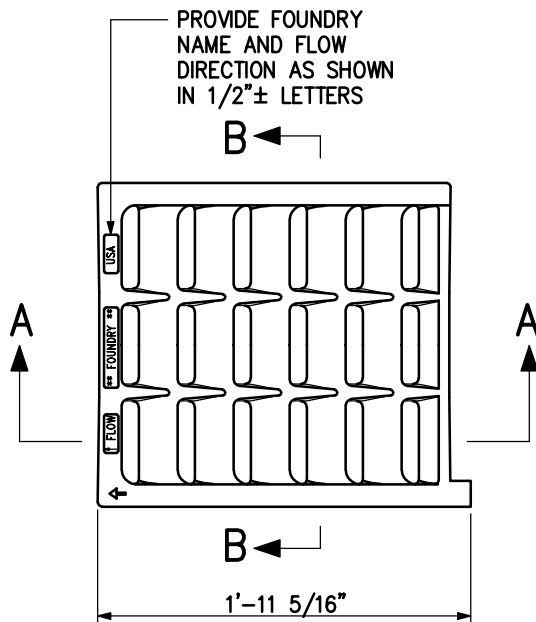
1. GRATE(S) SHALL SIT SQUARE UPON FRAME SUPPORTS WITHOUT ROCKING OR SHIFTING UNDER LOAD. GRATE SHALL MEET OR EXCEED AASHTO M306 PROOF LOAD REQUIREMENTS.
2. MATERIAL: GRAY IRON CASTINGS AASHTO DESIGNATION M105-06.
3. WEIGHT: GRATE APPROXIMATELY 129 LBS EACH.



DIRECTOR, DEPARTMENT OF PUBLIC WORKS


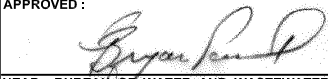

**CURVED VANE (E-CV) GRATE(S)
WITH CLASS 35 TYPE 'E' FRAME
NEW CONSTRUCTION**

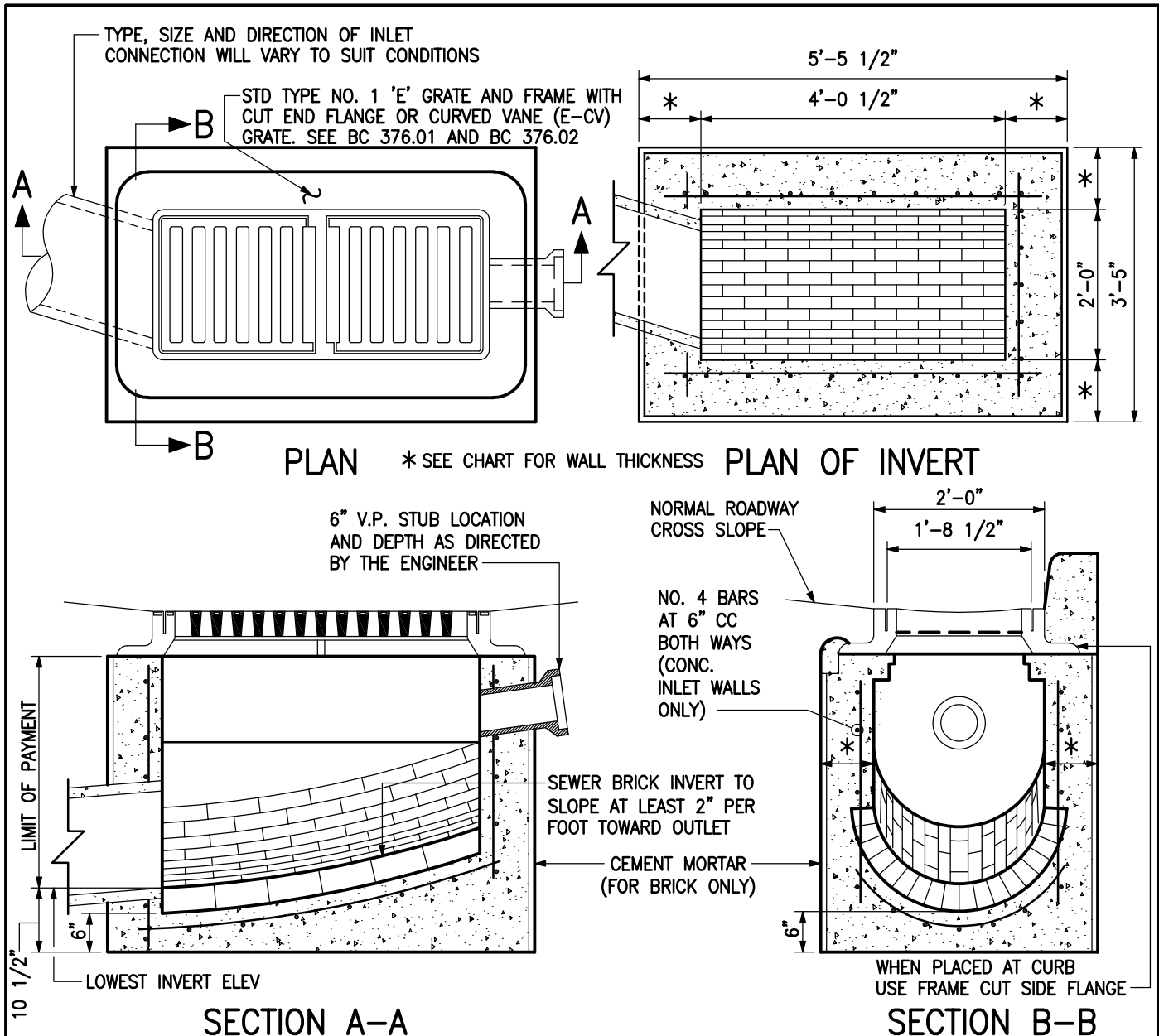
SHEET 1 OF 1



NOTES:

1. GRATE(S) SHALL SIT SQUARE UPON FRAME SUPPORTS WITHOUT ROCKING OR SHIFTING UNDER LOAD. GRATE SHALL MEET OR EXCEED AASHTO M306 PROOF LOAD REQUIREMENTS.
2. MATERIAL: GRAY IRON CASTINGS AASHTO DESIGNATION M105-06.
3. WEIGHT: GRATE APPROXIMATELY 140 LBS.


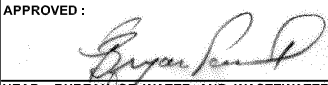

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER CURVED VANE (E-CV) GRATE(S) FOR EXISTING TYPE NO. 1 'E' FRAME	ISSUED	REVISED	REVISED
			3 / 2008		
			STANDARD NO. BC 376.03 SCALE : NONE SHEET 1 OF 1		

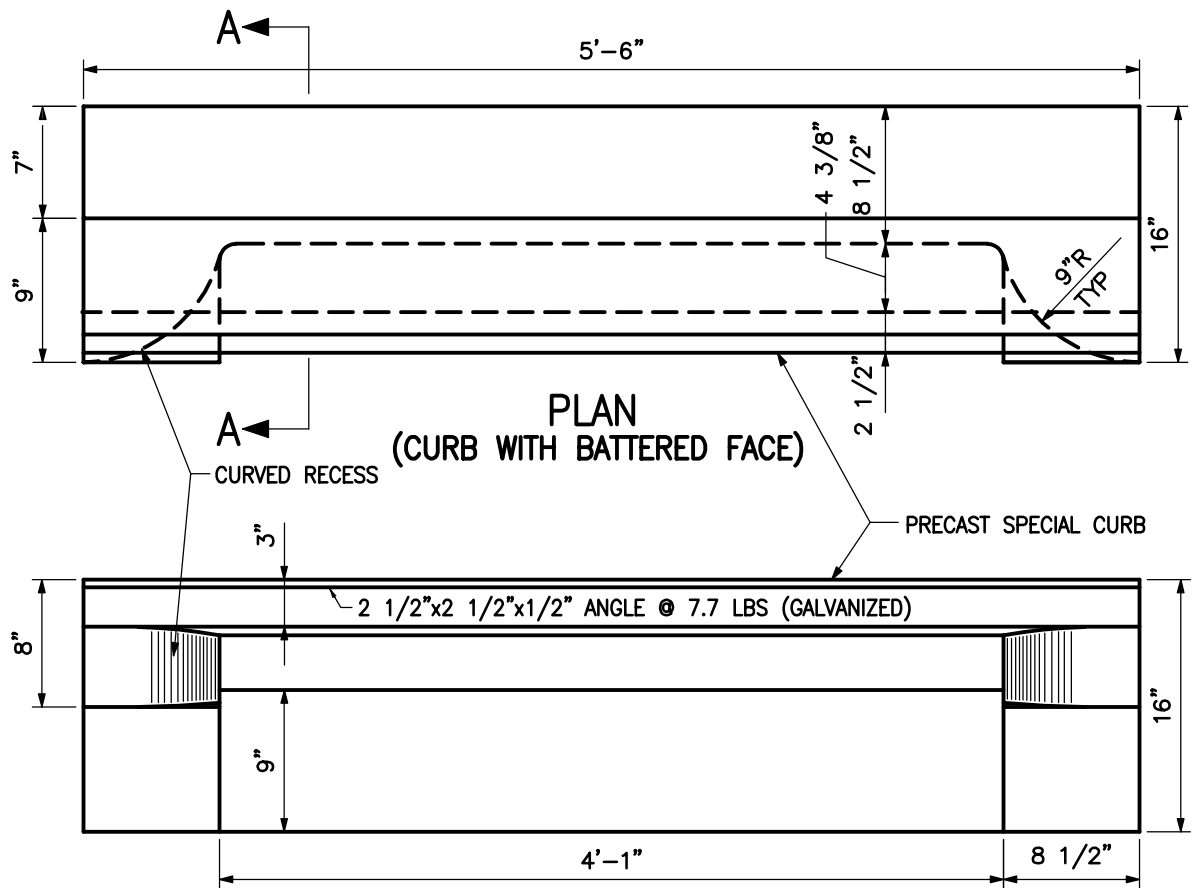


	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

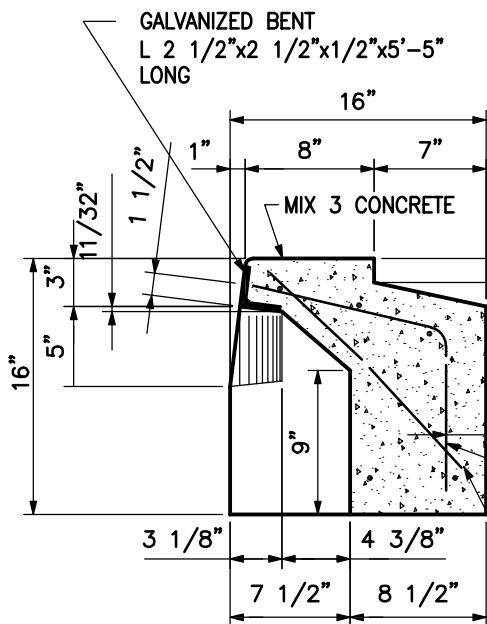
NOTES:

- INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS AT 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPECIFICATIONS FOR INLETS.
- TOP 4" OF PRECAST/CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
- PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
- IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
- COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF INLET.
- DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. DEPTH OF INLET CONNECTION IN ALLEYS TO BE 42" FROM INVERT TO ALLEY GRADE. NO DEVIATION FROM THESE DEPTHS WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 376.14		
TYPE 'E' INLET			SCALE: NONE	SHEET 1 OF 1	

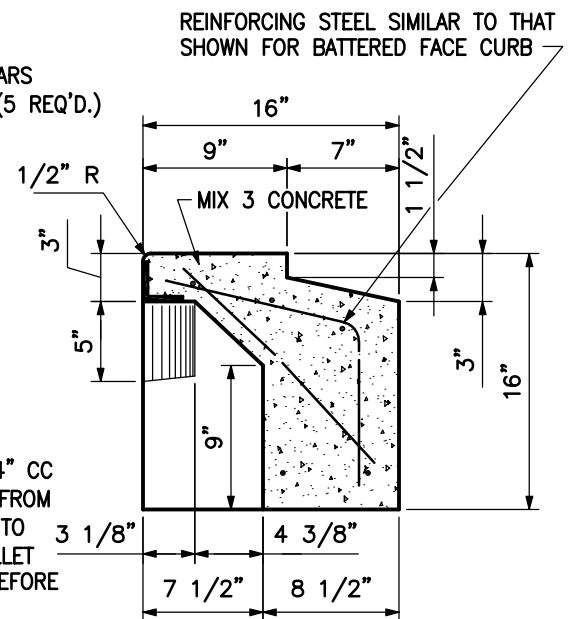


FRONT ELEVATION
(CURB WITH BATTERED FACE)



SECTION A-A
(BATTERED FACE)

ALL LONGITUDINAL BARS
NO. 4 5'-2" LONG (5 REQ'D.)



SECTION A-A
(VERTICAL FACE)



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

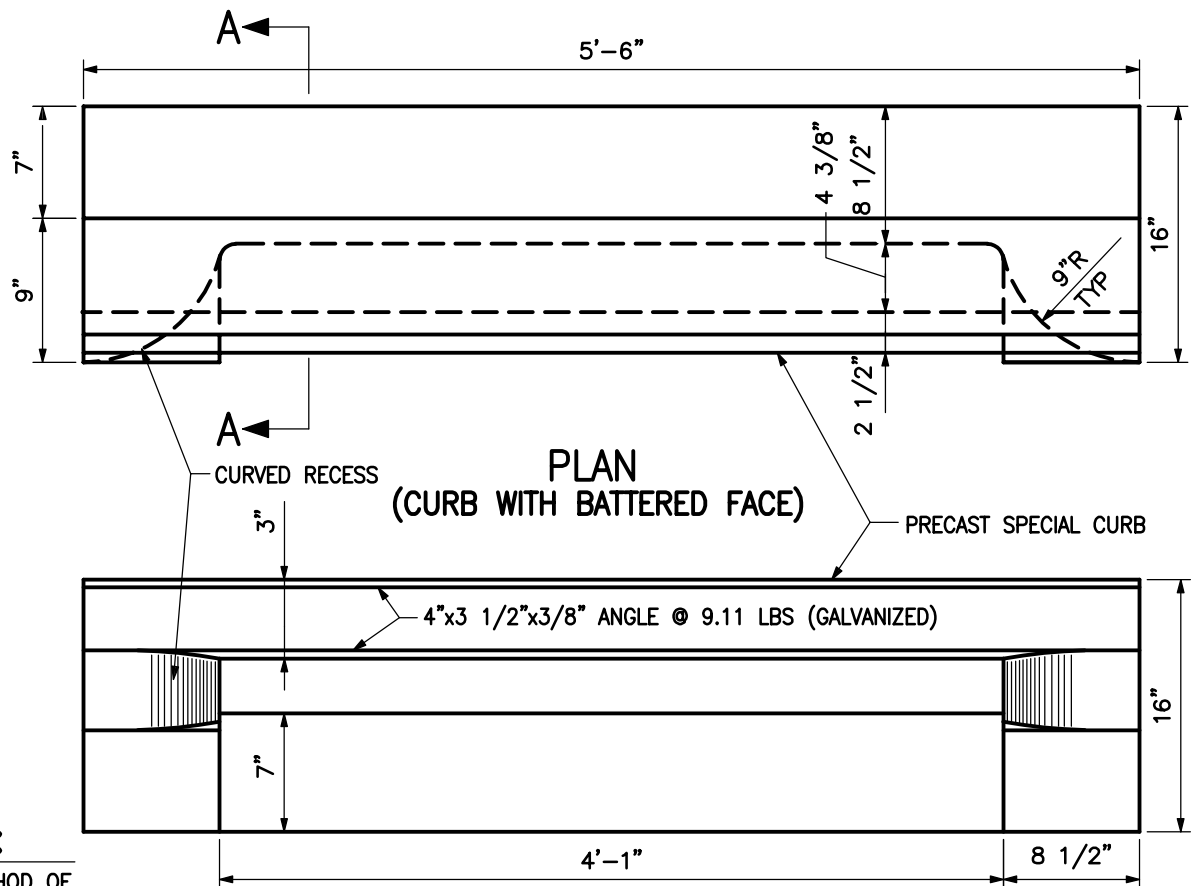
PRECAST SPECIAL CURB
FOR UNDEPRESSED 'E'
COMBINATION INLET

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 376.22

SCALE: NONE

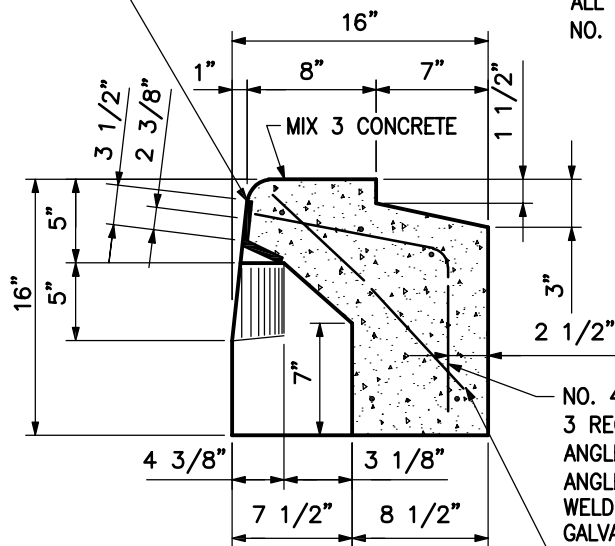
SHEET 1 OF 2



NOTE:

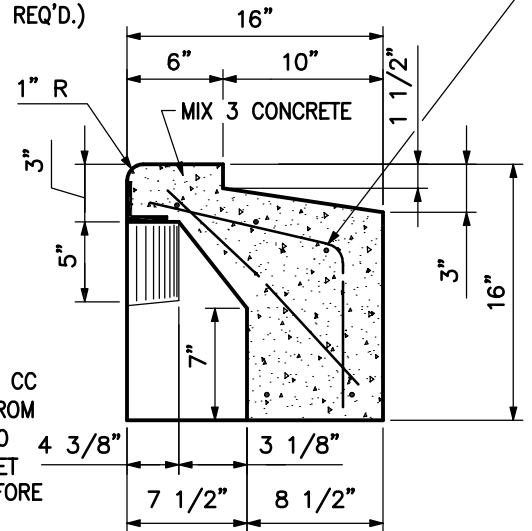
FOR METHOD OF
DEPRESSING PAVING AT
INLETS SEE BC 380.99

GALVANIZED BENT
L 4" x 3 1/2" x 3/8" x 5'-6" LONG



ALL LONGITUDINAL BARS
NO. 4 5'-2" LONG (5 REQ'D.)

REINFORCING STEEL SIMILAR TO THAT
SHOWN FOR BATTERED FACE CURB



NO. 4 BARS 24" CC
3 REQ'D. (BEGIN 9" FROM
ANGLE END) FASTEN TO
ANGLE WITH 1/4" FILLET
WELD ALL AROUND BEFORE
GALVANIZING.

NO. 4 BARS 12" CC
6 REQ'D.



APPROVED :
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

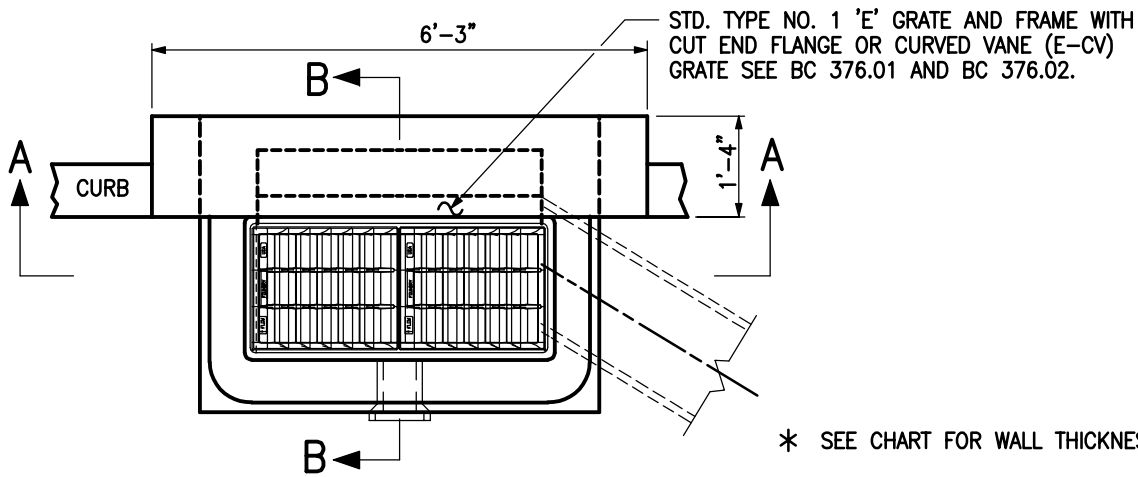
PRECAST SPECIAL CURB
FOR DEPRESSED 'E'
COMBINATION INLET

ISSUED	REVISED	REVISED
3 / 2008		

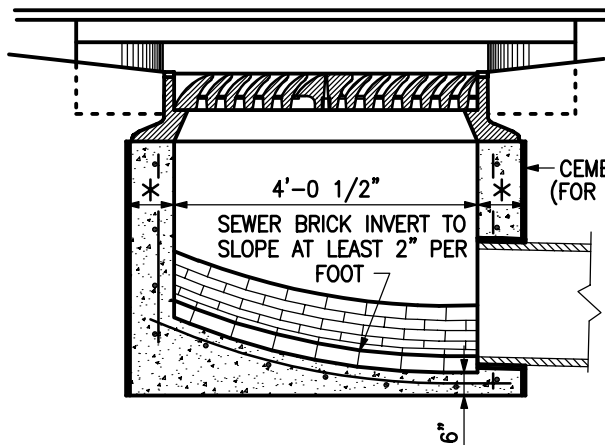
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BC 376.22

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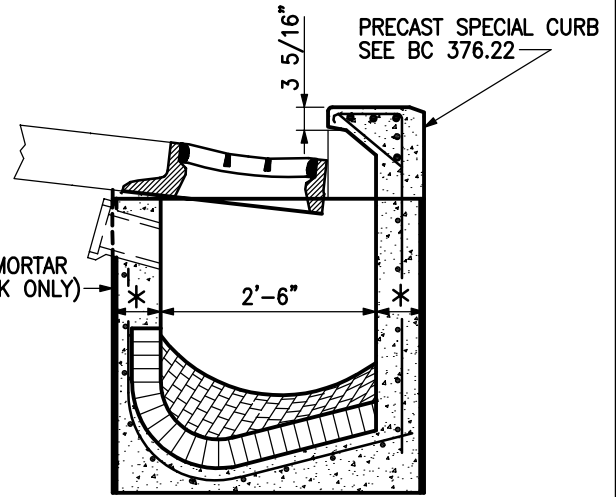
SHEET 2 OF 2



PLAN



SECTION A-A



SECTION B-B

	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2 "
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS AT 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPECIFICATIONS FOR INLETS.
2. TOP 4" OF PRECAST/CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. DEPTH OF INLET CONNECTION IN ALLEYS TO BE 42" FROM INVERT TO ALLEY GRADE. NO DEVIATION FROM THESE DEPTHS WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.



APPROVED :

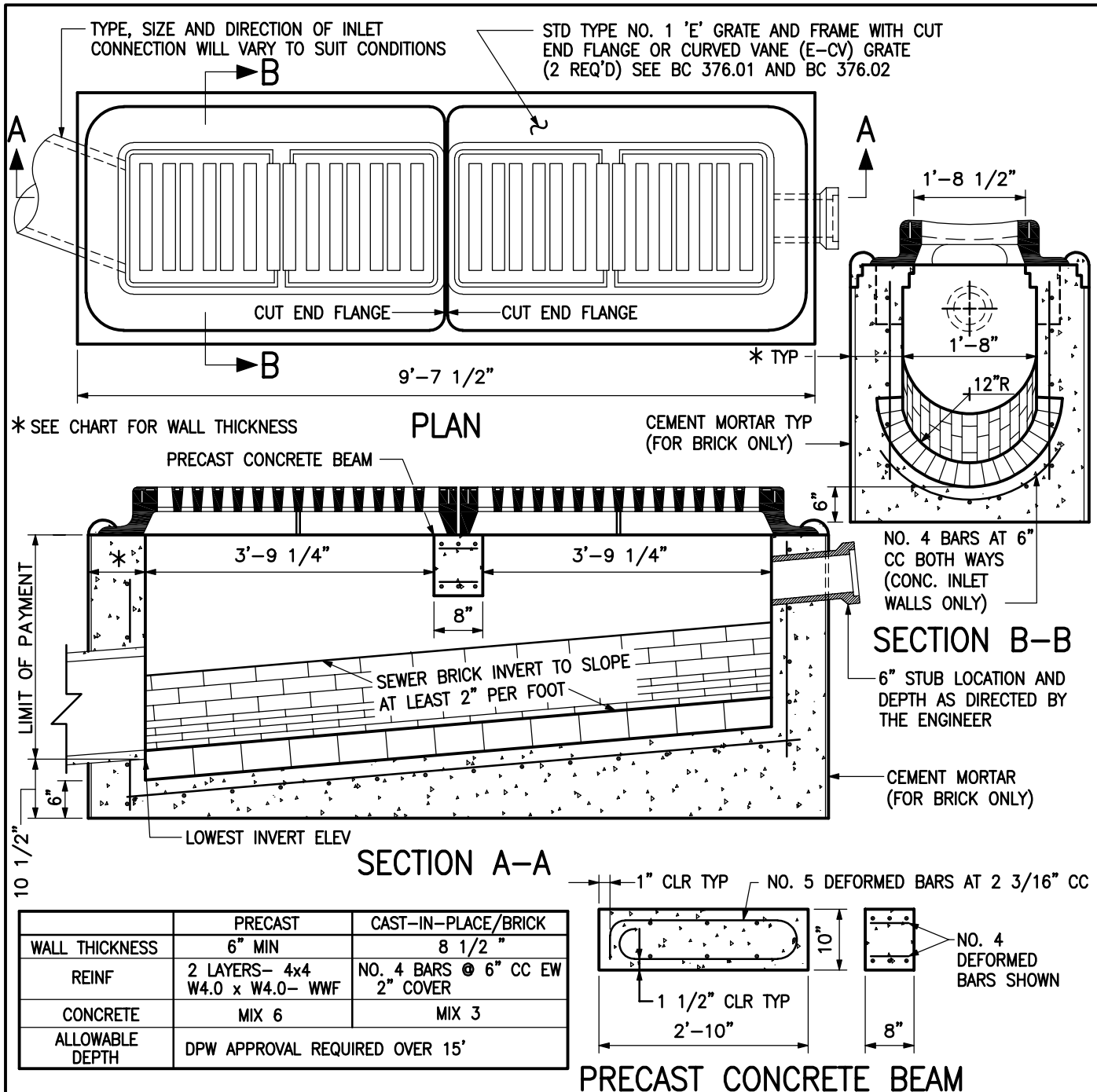
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER



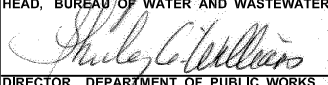
TYPE 'E'
COMBINATION INLET

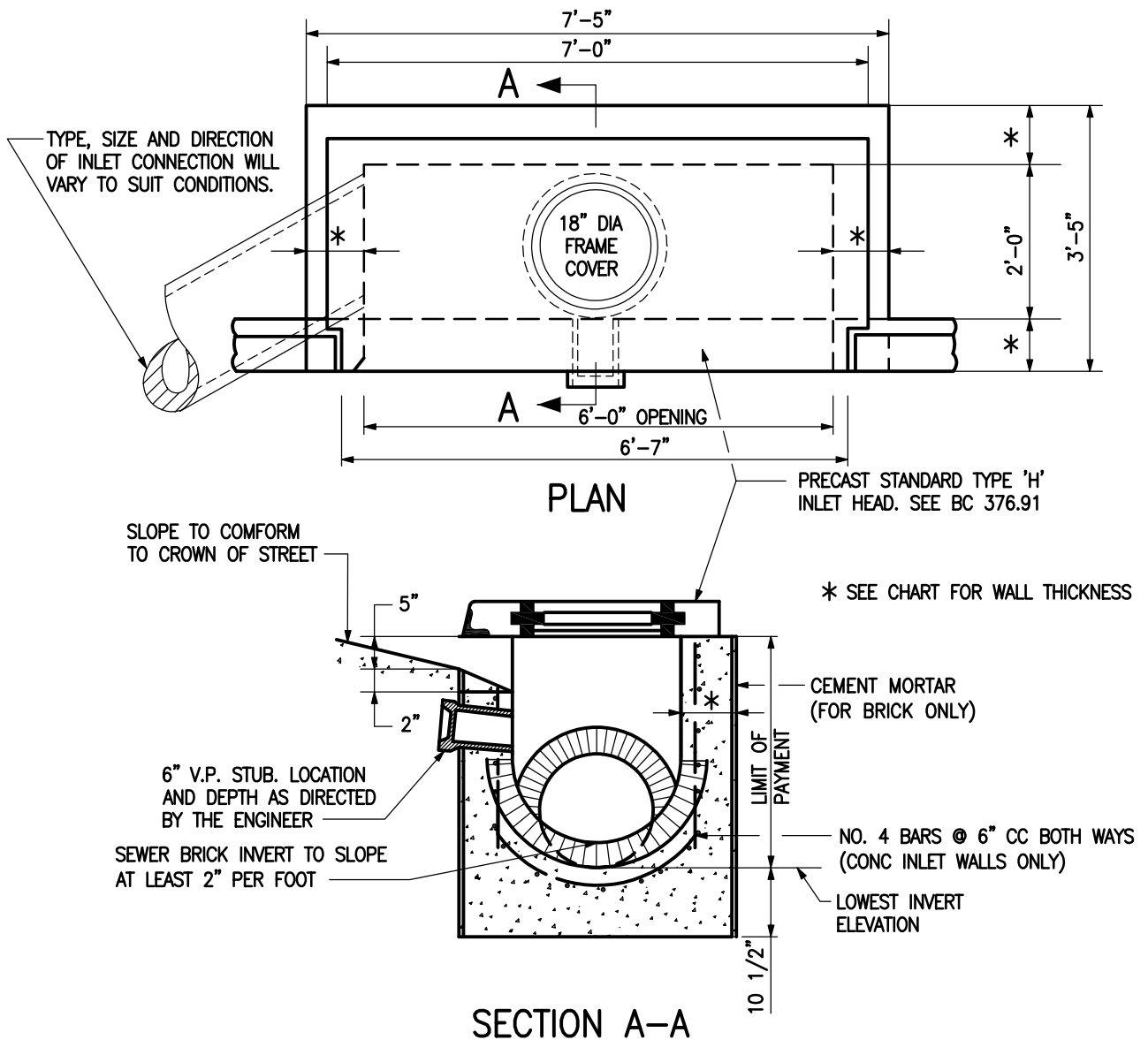
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 376.24		
SCALE : NONE		SHEET 1 OF 1



NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS AT 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPECIFICATIONS FOR INLETS.
2. TOP 4" OF PRECAST/CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. DEPTH OF INLET CONNECTION IN ALLEYS TO BE 42" FROM INVERT TO ALLEY GRADE. NO DEVIATION FROM THESE DEPTHS WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.




	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 376.30		
DUPLEX TYPE 'E' INLET			SCALE: NONE	SHEET 1 OF 1	

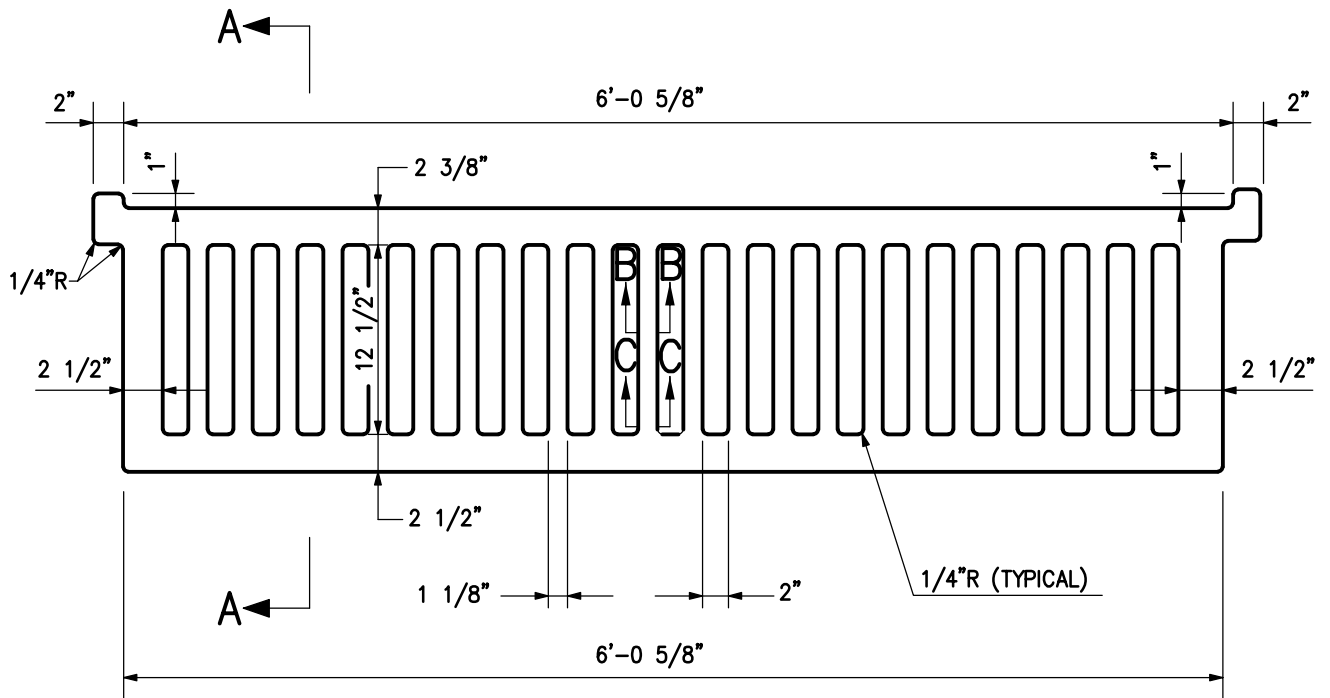


	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

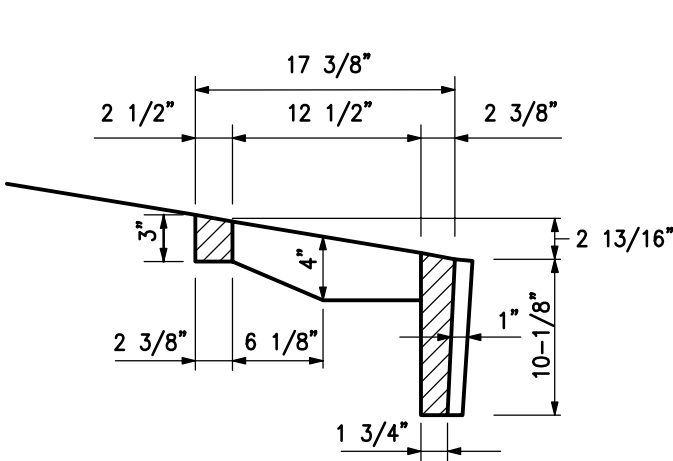
NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK OR MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS @ 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPEC FOR INLETS.
2. TOP 4" OF CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS @ 12" CC BOTH WAYS. 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. NO DEVIATION FROM THIS DEPTH WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.

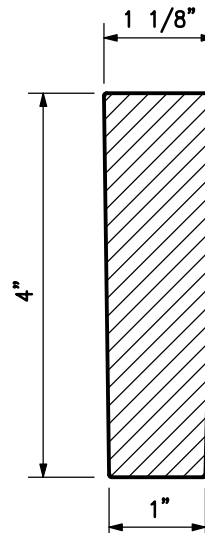
	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 376.54		
TYPE 'H' INLET			SCALE: NONE	SHEET 1 OF 1	



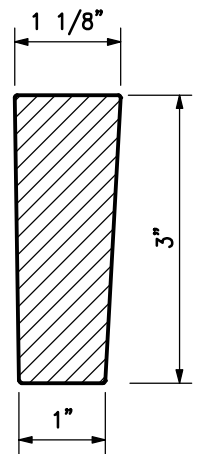
PLAN



SECTION A-A



SECTION B-B
HALF SIZE



SECTION C-C
HALF SIZE

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 376.62		
	TYPE NO. 2 'H' GRATE		SCALE : NONE		SHEET 1 OF 1

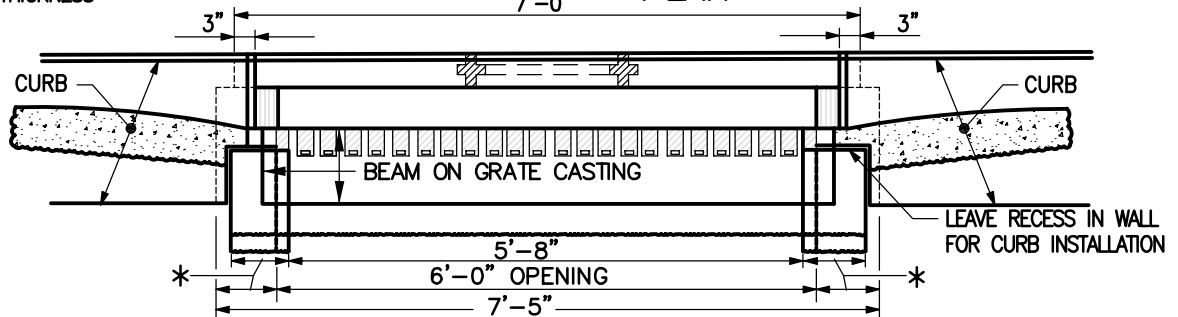
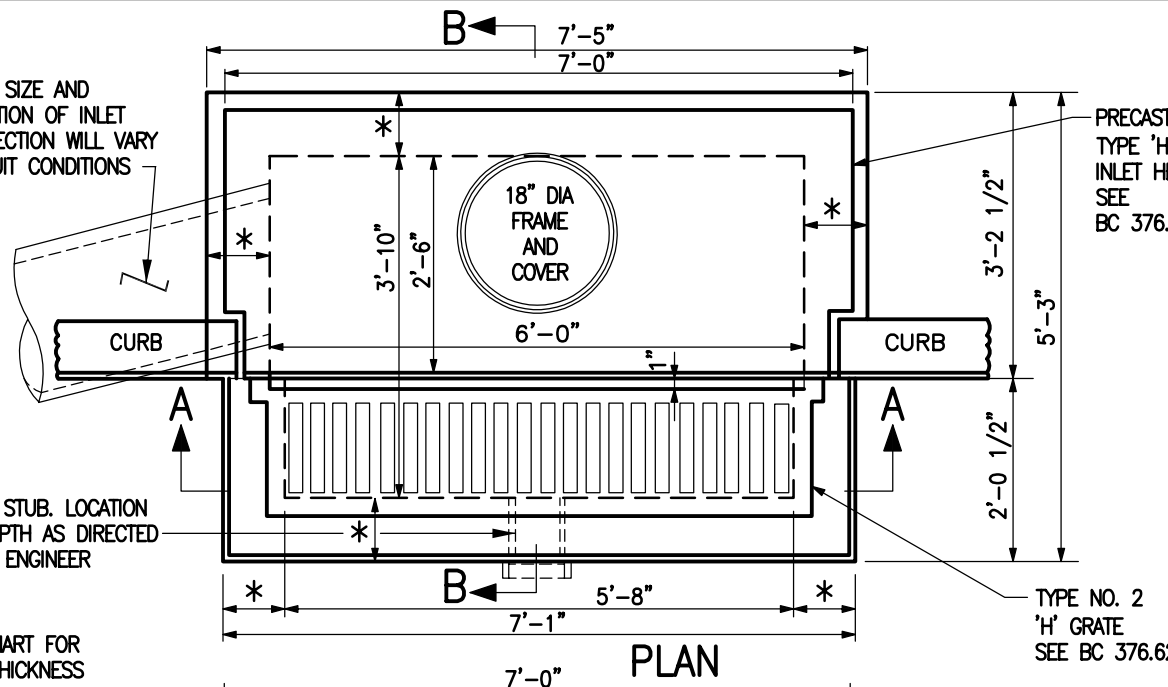
TYPE, SIZE AND
DIRECTION OF INLET
CONNECTION WILL VARY
TO SUIT CONDITIONS

6" V.P. STUB. LOCATION
AND DEPTH AS DIRECTED
BY THE ENGINEER

* SEE CHART FOR
WALL THICKNESS

PRECAST
TYPE 'H'
INLET HEAD
SEE
BC 376.91

TYPE NO. 2
'H' GRATE
SEE BC 376.62

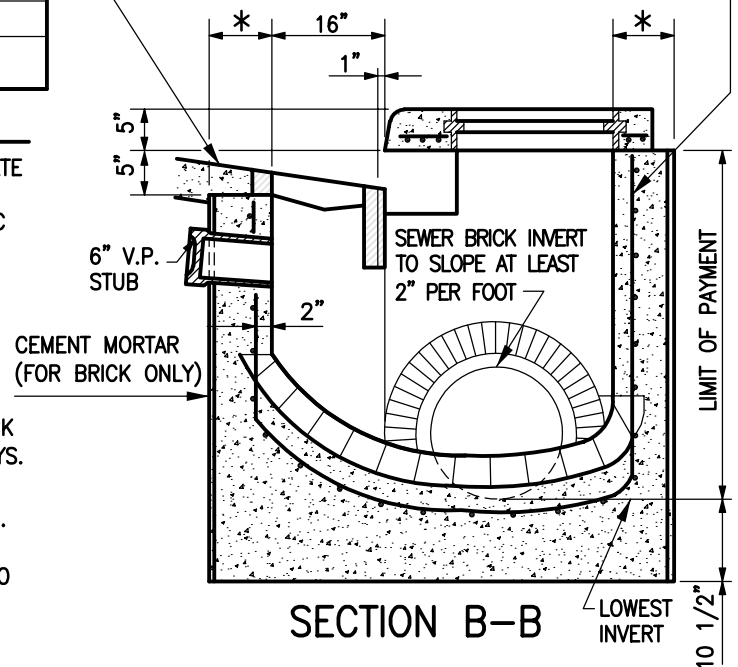


	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

SECTION A-A

NO. 4 BARS @ 6" CC BOTH WAYS
(CONC INLET WALLS ONLY)

SLOPE TOP - CONFORM
TO CROWN STREET



NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK OR MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS @ 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPEC FOR INLETS.
2. TOP 4" OF CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS @ 12" CC BOTH WAYS. 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. NO DEVIATION FROM THIS DEPTH WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.



APPROVED :
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

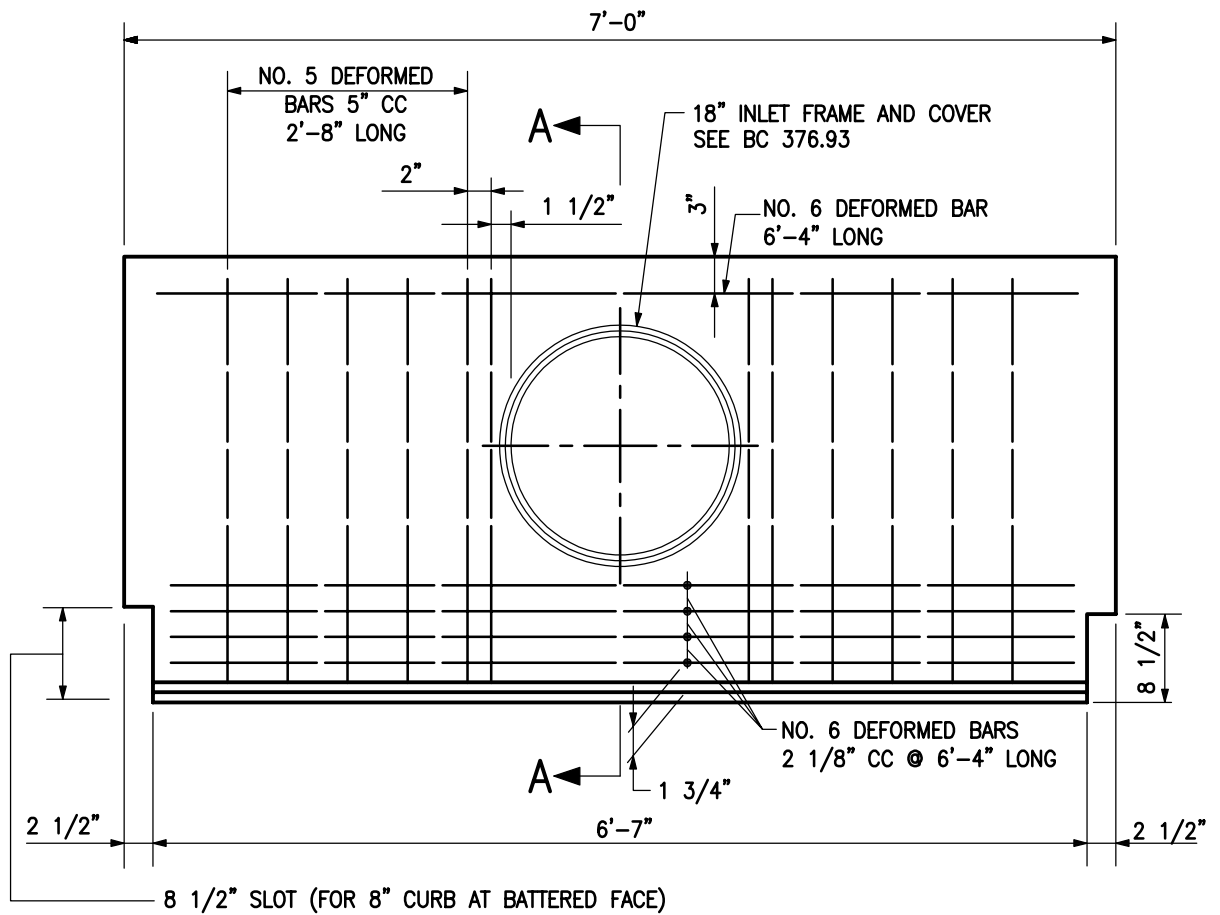
TYPE 'H'
COMBINATION INLET

ISSUED	REVISED	REVISED
3 / 2008		

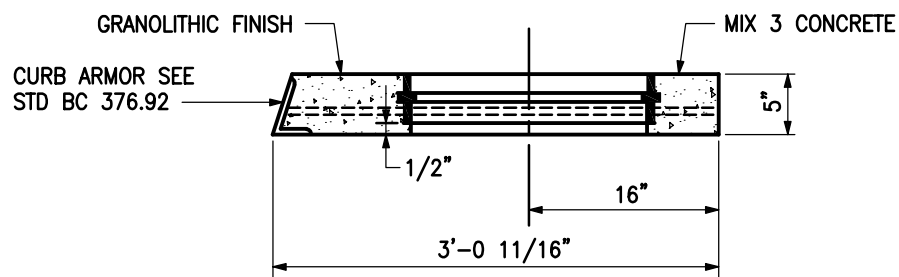
STANDARD NO.
BC 376.64

SCALE : NONE


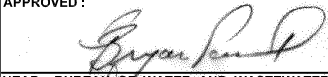

SHEET 1 OF 1

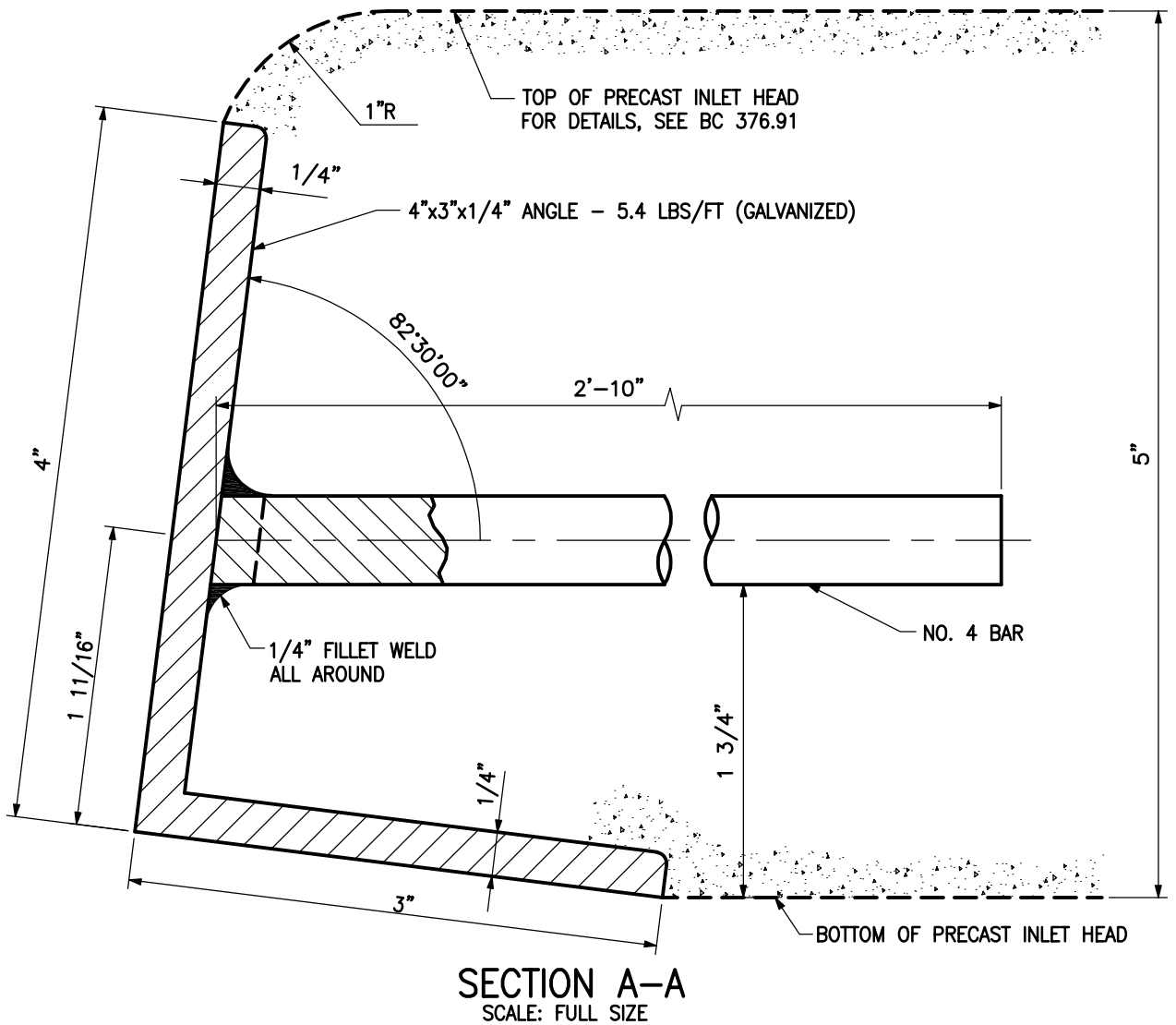
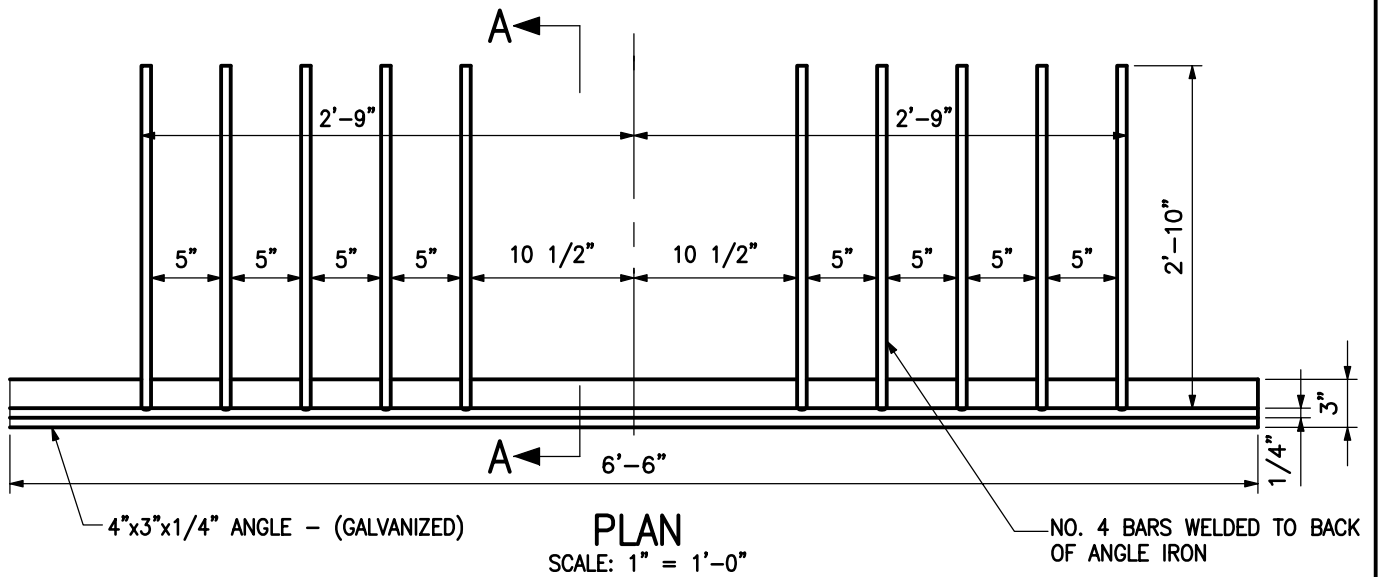


PLAN



SECTION A-A

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 376.91		
			SCALE : NONE	SHEET 1 OF 1	



APPROVED:

[Signature]

HEAD, BUREAU OF WATER AND WASTEWATER

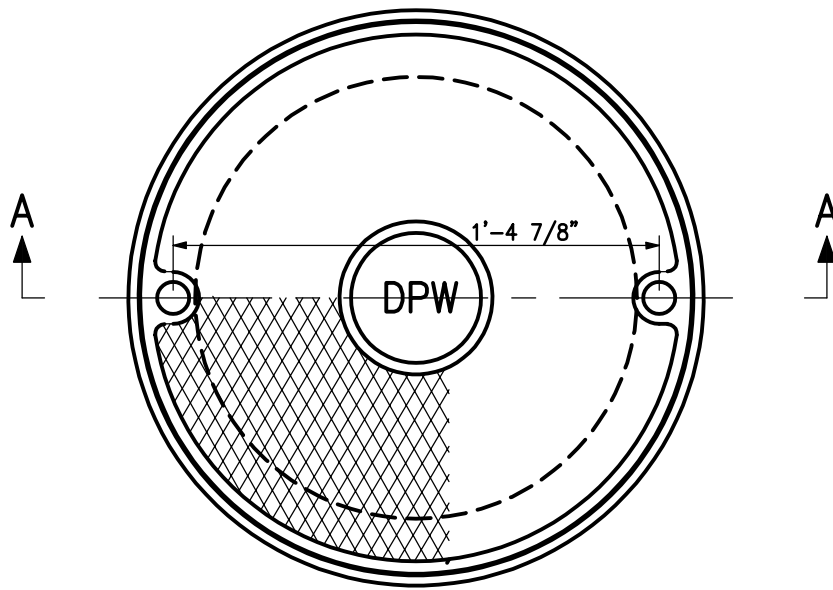
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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

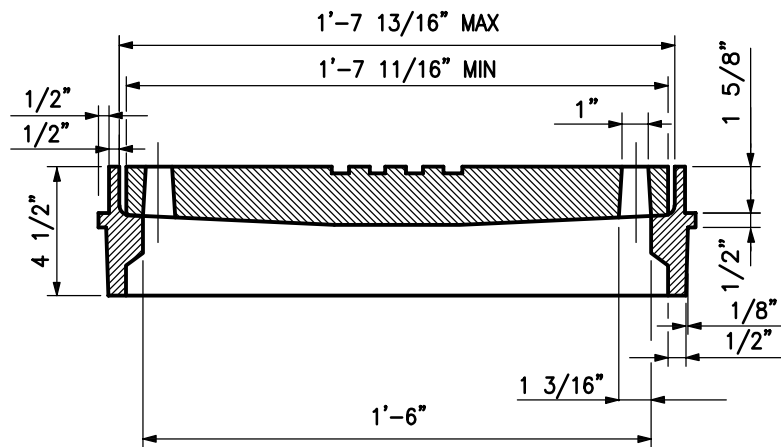
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

CURB ARMOR FOR TYPE
'H' INLET HEAD



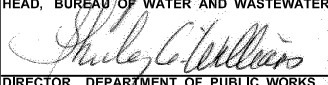
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 376.92		
SCALE: NONE		SHEET 1 OF 1

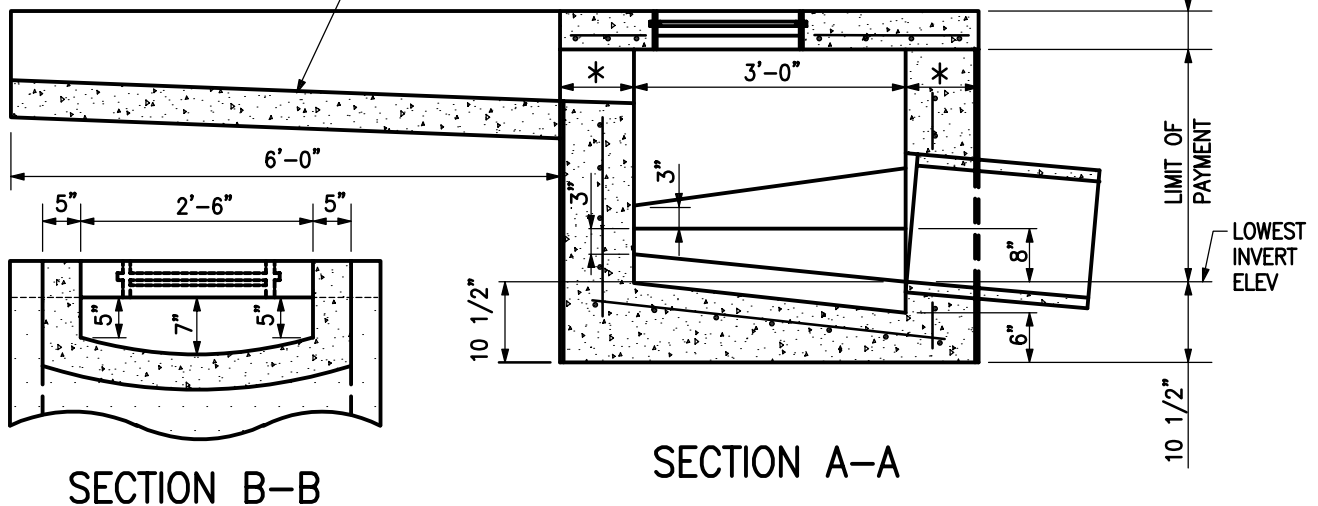
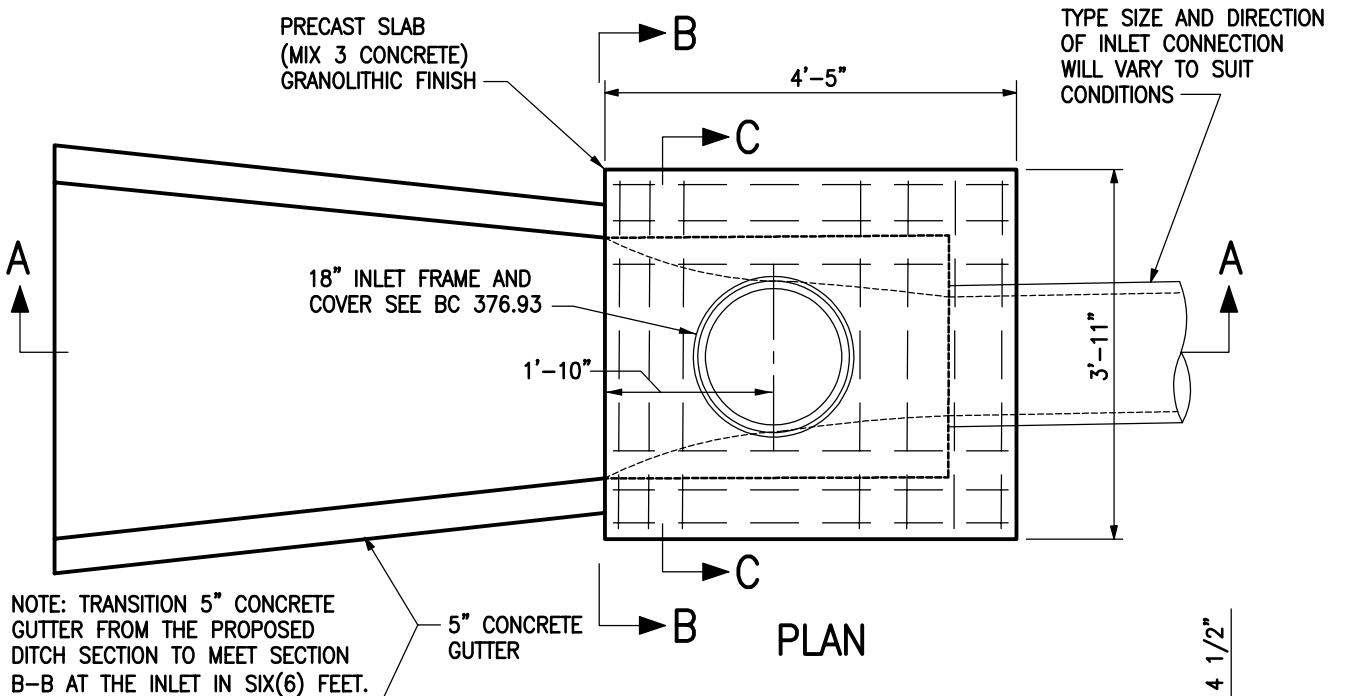


PLAN

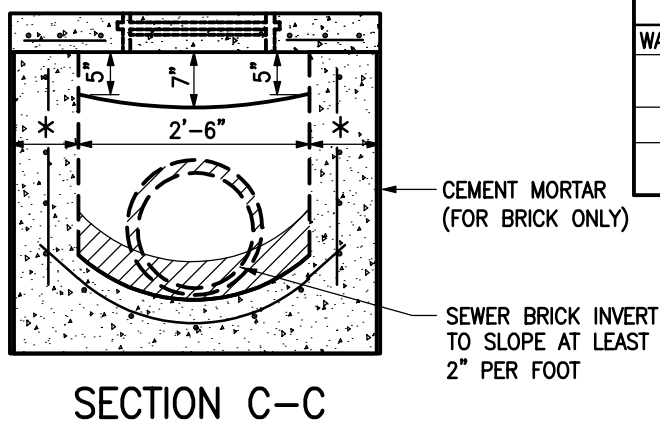


SECTION A-A


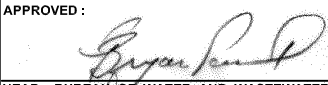

	APPROVED :	<p>CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER</p> <p>18 IN. INLET FRAME AND COVER</p>	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		<p>STANDARD NO. BC 376.93</p>		
			SCALE : NONE	SHEET 1 OF 1	



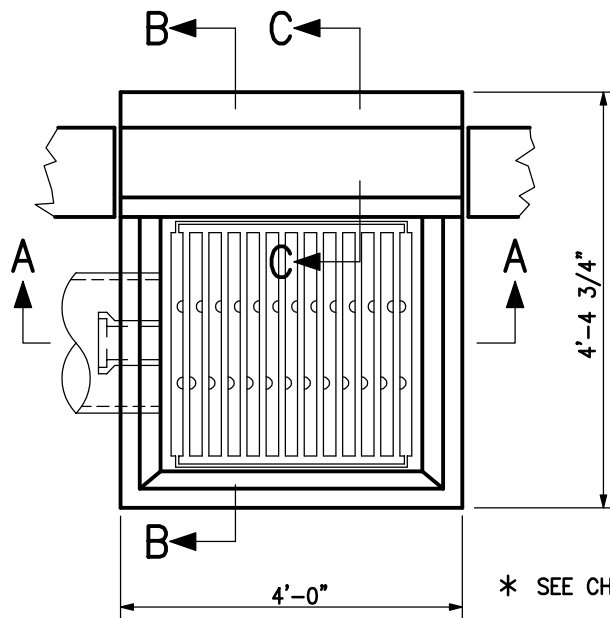
* SEE CHART FOR WALL THICKNESS



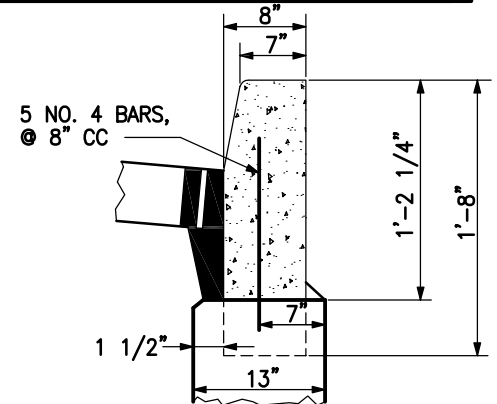
	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 377.12		
TYPE 'J' CHUTE INLET			SCALE : NONE	SHEET 1 OF 1	

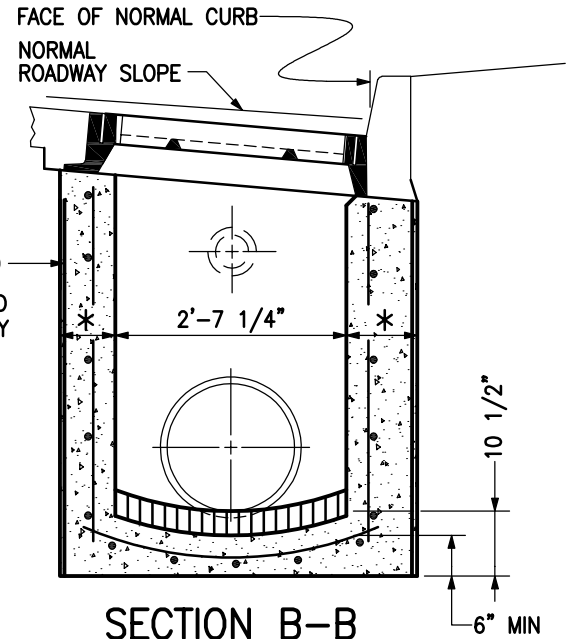
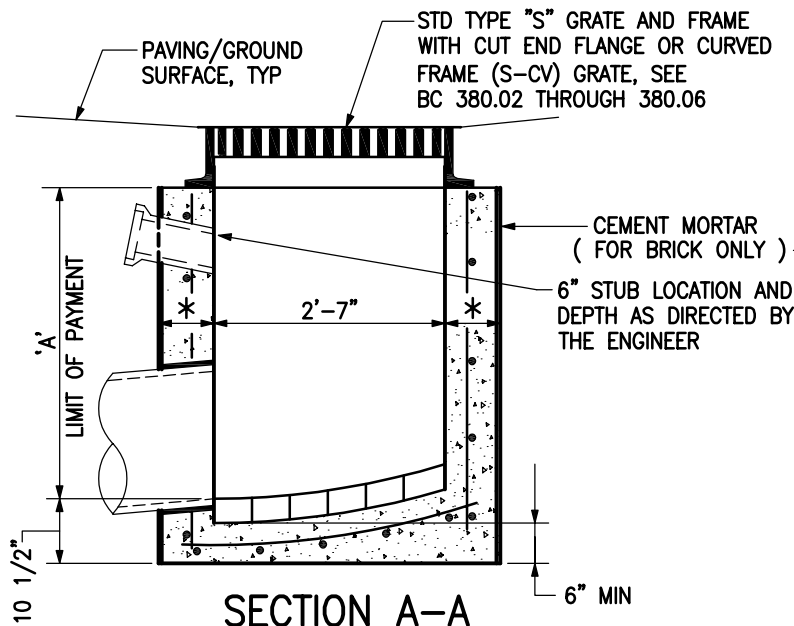
	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2"
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	



* SEE CHART FOR WALL THICKNESS



SECTION C-C
TYPE 'A' CURB



NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST MIX 3 CONCRETE WITH NO. 4 DEFORMED BARS AT 6" CC BOTH WAYS. 2" CLEAR FROM FACE OF INSIDE WALL. SEE LATEST DPW SPECIFICATIONS FOR INLETS.
2. TOP 4" OF PRECAST/CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT; AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
5. COST OF FURNISHING AND PLACING 6" V.P. STUB WITH V.P. STOPPER TO BE INCLUDED IN THE PRICE BID PER LINEAR FOOT OF INLET.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED CURB GRADE. DEPTH OF INLET CONNECTION IN ALLEYS TO BE 42" FROM INVERT TO ALLEY GRADE. NO DEVIATION FROM THESE DEPTHS WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.



APPROVED :
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

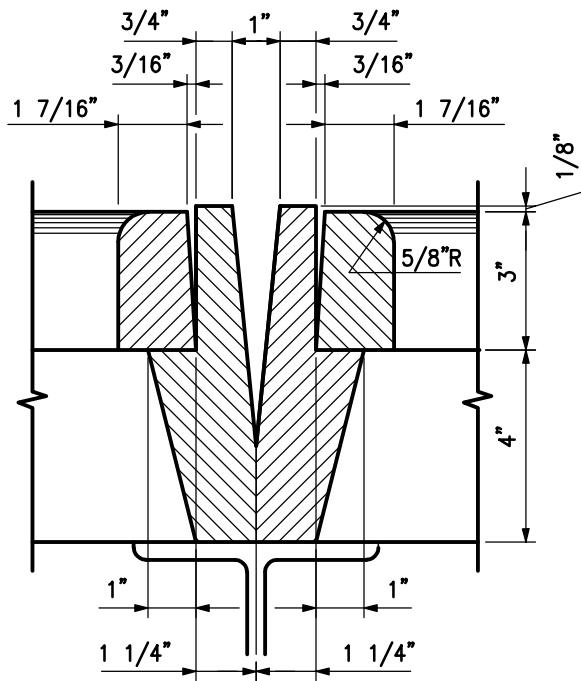
TYPE 'S' INLET
SINGLE GRATE

ISSUED	REVISED	REVISED
3 / 2008		

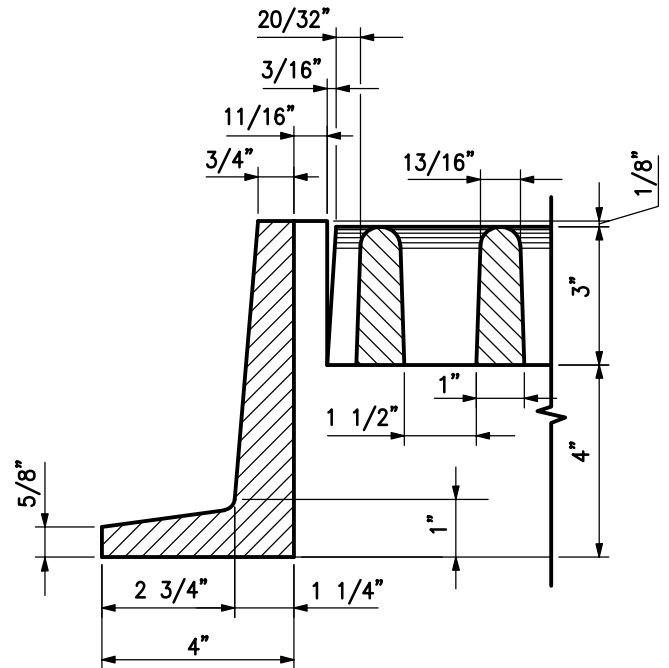
STANDARD NO.
BC 380.01

SCALE : NONE

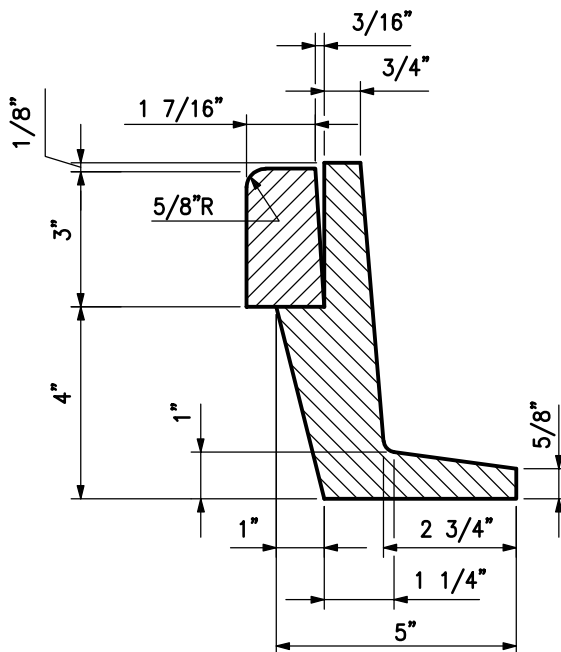
SHEET 1 OF 1



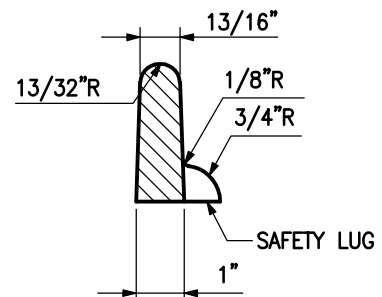
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

NOTE:

FOR PLAN VIEW OF THESE SECTIONS, SEE BC 380.02.



APPROVED :

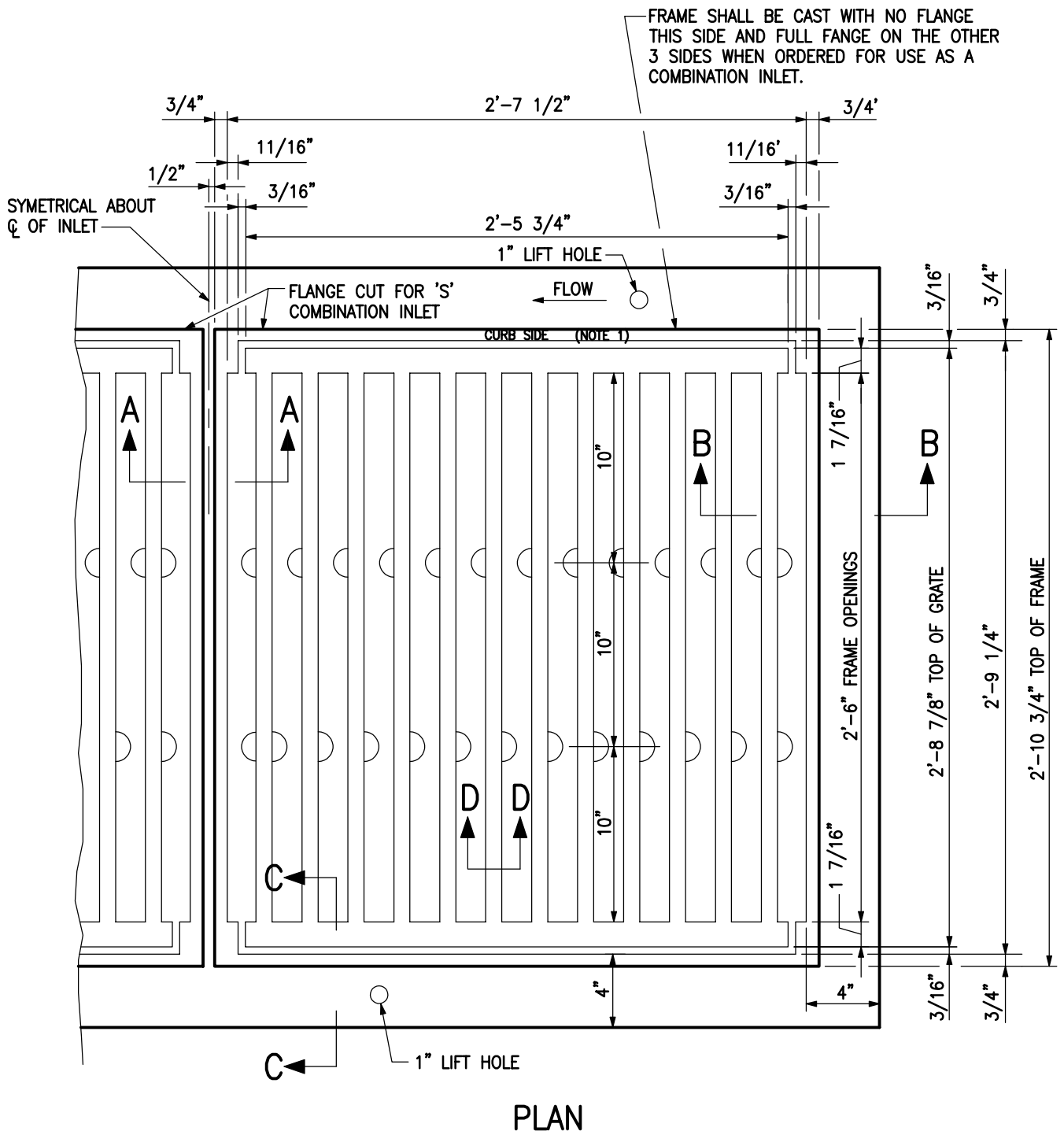
 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER




TYPE 'S' FRAME AND GRATE
 SECTIONS PARALLEL BARS

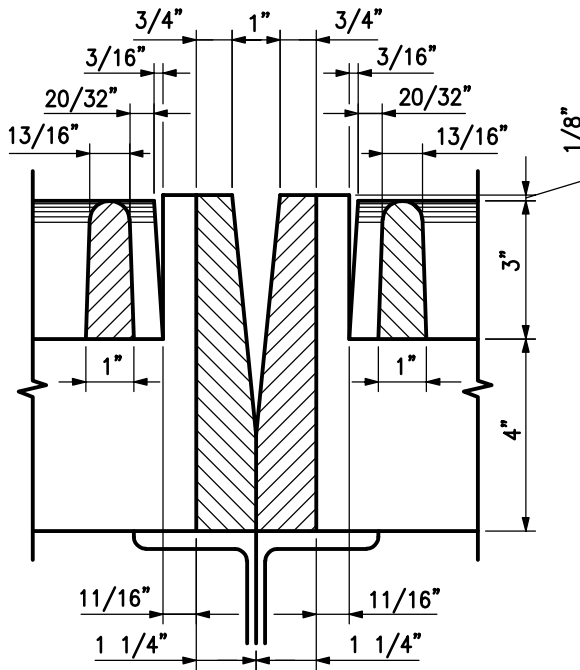
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 380.03		
SCALE : NONE		SHEET 1 OF 1



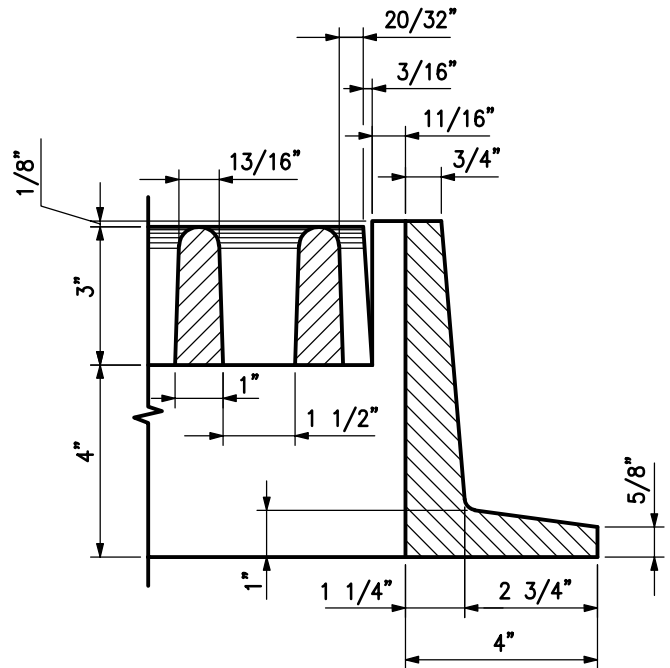
NOTES:

- 3/4" STANDARD FLAT FACE GOTHIC LETTERS RAISED 1/8".
- CASTING MATERIALS SHALL BE GRAY IRON AND SHALL MEET OR EXCEED AASHTO M-306 PROOF LOAD REQUIREMENTS.
- FOR SECTIONAL VIEWS OF THIS FRAME AND GRATE, SEE STANDARD NO. BC 380.05.

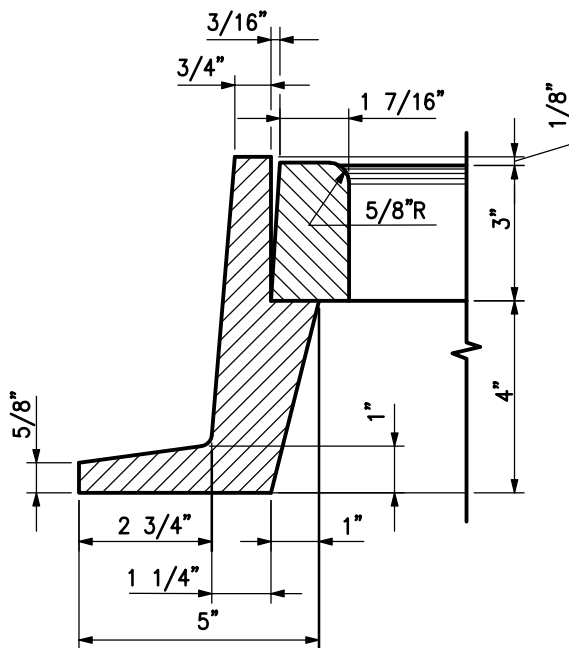
	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	HEAD, BUREAU OF WATER AND WASTEWATER	TYPE 'S' FRAME AND GRATE TRANSVERSE BARS	STANDARD NO. BC 380.04		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		SCALE : NONE	SHEET 1 OF 1	



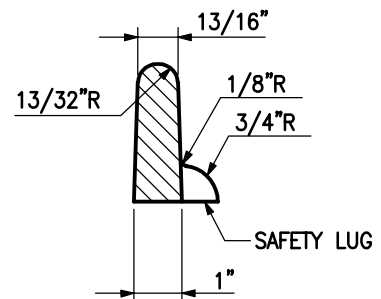
SECTION A-A



SECTION B-B



SECTION C-C



SECTION D-D

NOTE:

FOR PLAN VIEW OF THESE SECTIONS, SEE BC 380.04.



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

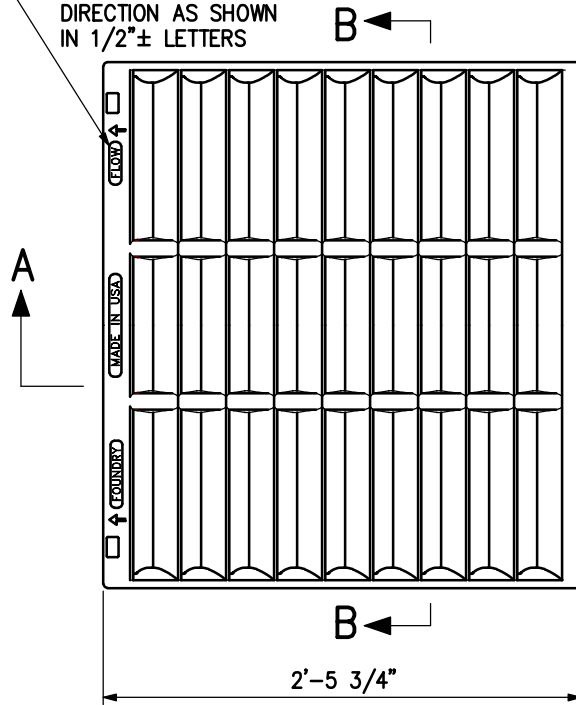
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

TYPE 'S' FRAME AND GRATE
 SECTIONS TRANSVERSE BARS

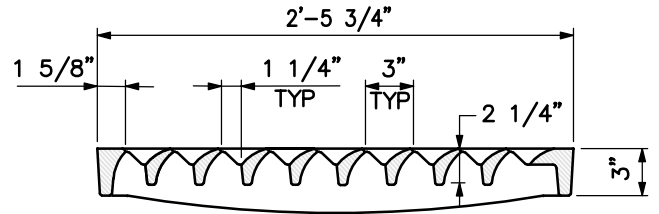
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 380.05		
SCALE : NONE		SHEET 1 OF 1

SHEET 1 OF 1

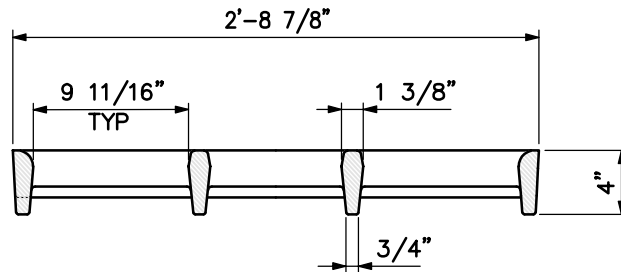
PROVIDE FOUNDRY
NAME AND FLOW
DIRECTION AS SHOWN
IN 1/2"± LETTERS



PLAN



SECTION A-A



SECTION B-B

NOTES:

1. GRATE(S) SHALL SIT SQUARE UPON FRAME SUPPORTS WITHOUT ROCKING OR SHIFTING UNDER LOAD. GRATE SHALL MEET OR EXCEED AASHTO M306 PROOF LOAD REQUIREMENTS.
2. MATERIAL: GRAY IRON CASTING AASHTO DESIGNATION M105-06
3. WEIGHT: GRATE APPROXIMATELY 308 LBS.



APPROVED :

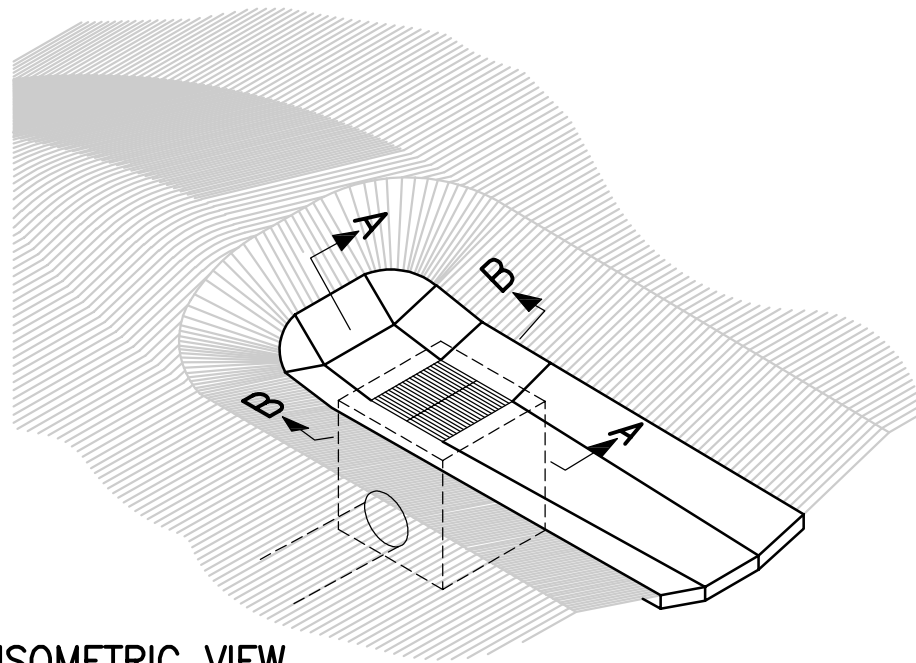
HEAD, BUREAU OF WATER AND WASTEWATER

DIRECTOR, DEPARTMENT OF PUBLIC WORKS

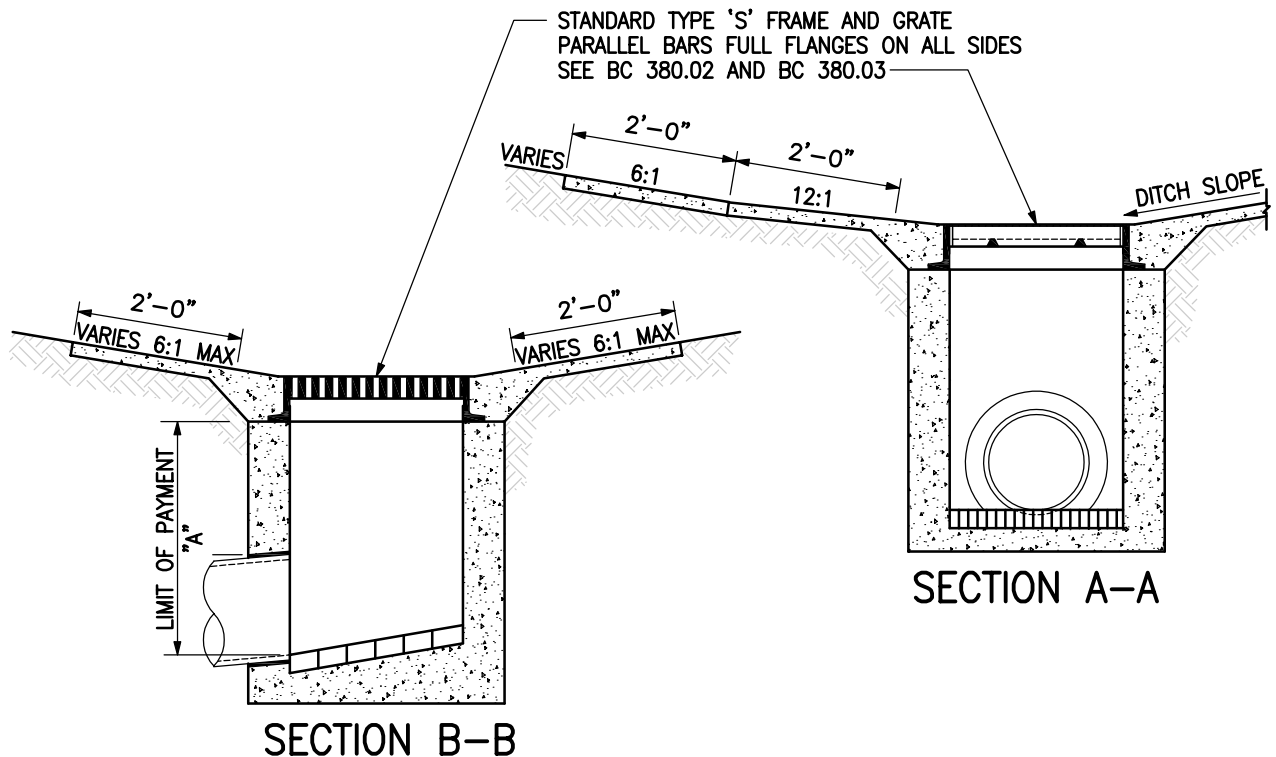
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

CURVED VANE (S-CV) GRATE(S)
FOR EXISTING TYPE 'S' FRAME

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 380.07		
SCALE : NONE		SHEET 1 OF 1



ISOMETRIC VIEW



NOTES:

1. THE CONCRETE MEDIAN DITCH TO BE USED IN CONNECTION WITH THIS INLET, WILL BE WARPED FROM THE STANDARD SECTION TO MEET THE SECTION AT THE END OF THE INLET. THIS TRANSITION WILL TAKE PLACE WITHIN A DISTANCE OF TEN (10) FEET FROM THE INLET.
2. FOR INLET STRUCTURE SEE BC 380.21

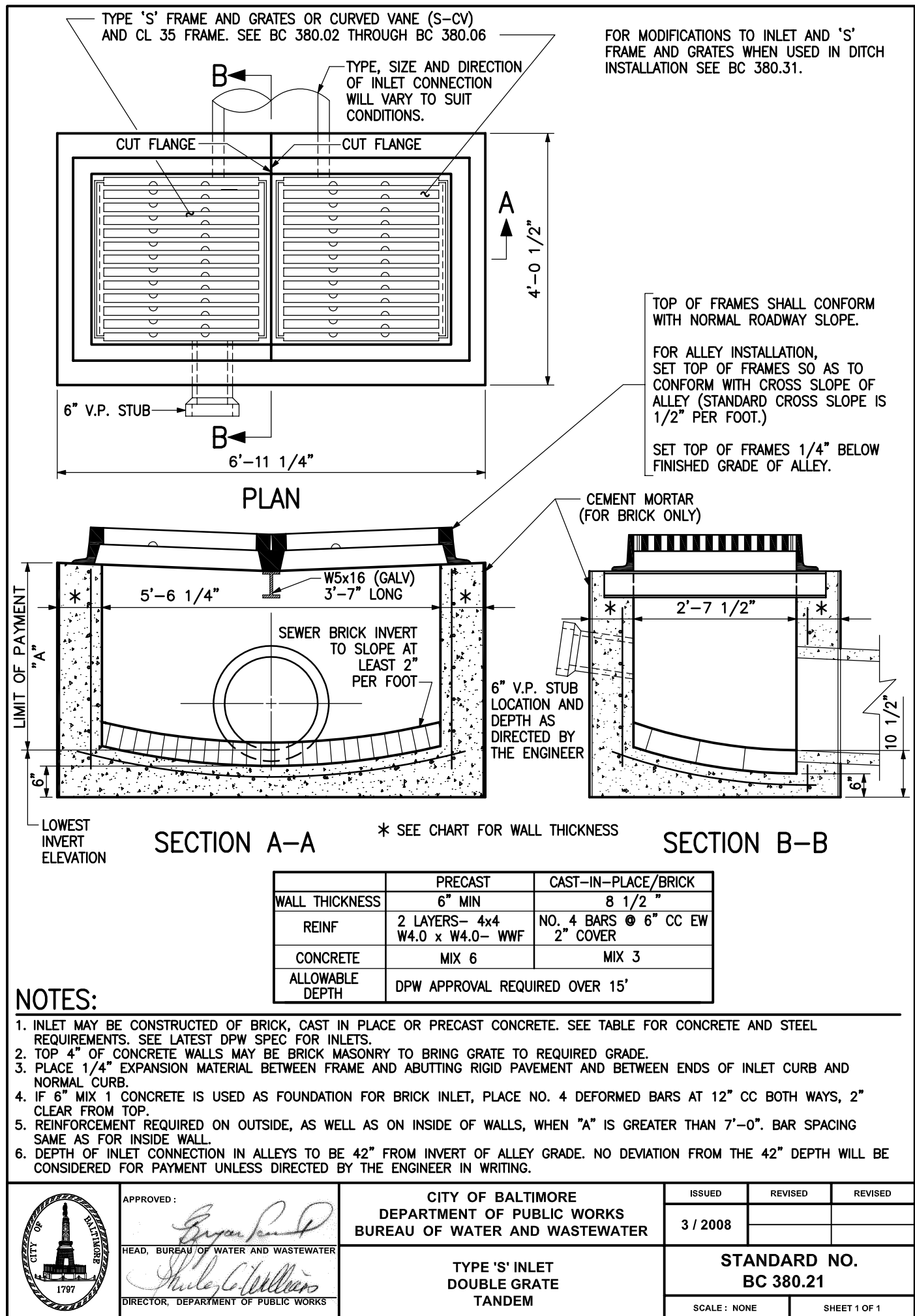


APPROVED : *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

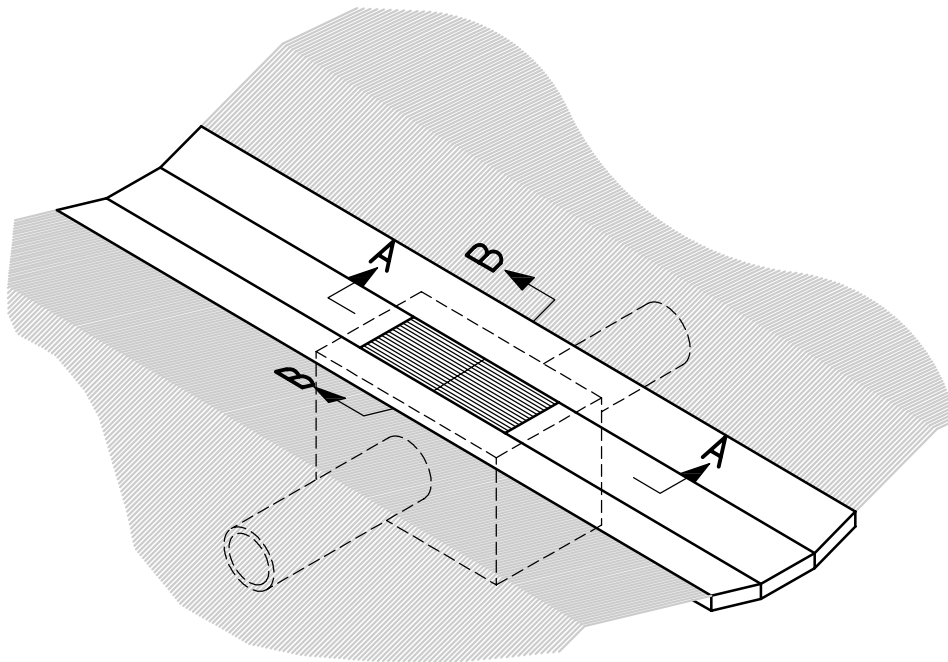
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPE 'S' INLET
SINGLE GRATE
(DITCH INSTALLATION)

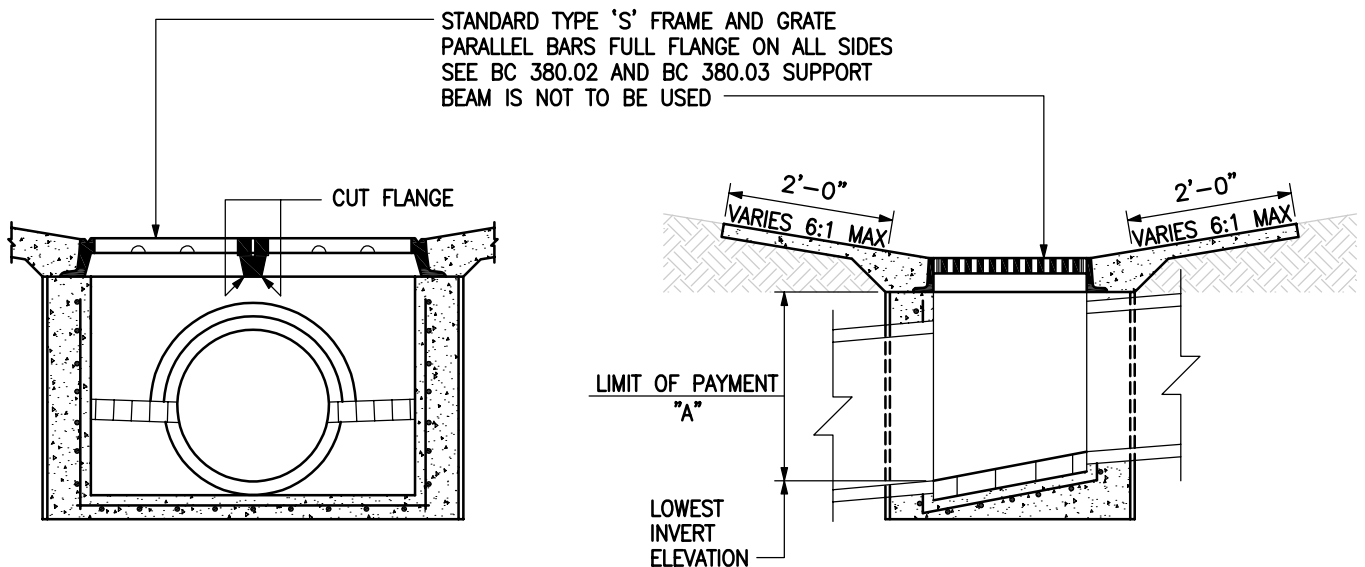
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 380.11		
SCALE : NONE		SHEET 1 OF 1



	PRECAST	CAST-IN-PLACE/BRICK
WALL THICKNESS	6" MIN	8 1/2 "
REINF	2 LAYERS- 4x4 W4.0 x W4.0- WWF	NO. 4 BARS @ 6" CC EW 2" COVER
CONCRETE	MIX 6	MIX 3
ALLOWABLE DEPTH	DPW APPROVAL REQUIRED OVER 15'	



ISOMETRIC VIEW



NOTE: FOR INLET BOX DIMENSIONS AND DETAILS, SEE BC 380.21

SECTION A-A

SECTION B-B

NOTES:

1. THE CONCRETE MEDIAN DITCH TO BE USED IN CONNECTION WITH THIS INLET, WILL BE WARPED FROM THE STANDARD SECTION TO MEET THE SECTION AT THE END OF THE INLET. THIS TRANSITION WILL TAKE PLACE WITHIN A DISTANCE OF TEN (10) FEET FROM THE INLET.
2. FOR INLET AT DITCH TERMINUS, MODIFY SLOPES AS SHOWN ON BC 380.11
3. FOR INLET STRUCTURE SEE BC 380.21



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 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

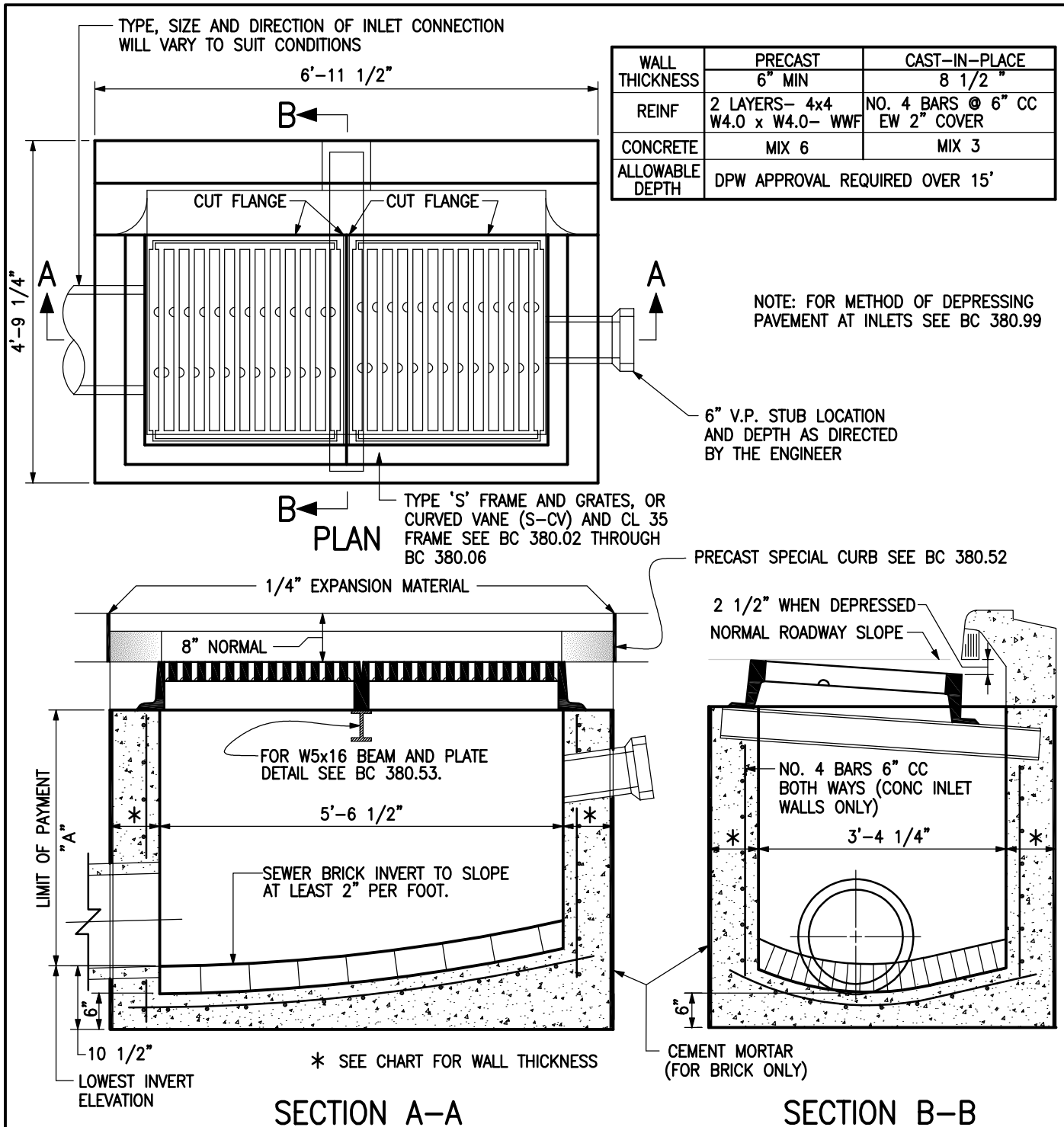
TYPE 'S' INLET
 DOUBLE GRATE TANDEM
 (DITCH INSTALLATION)

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 380.31




SCALE : NONE

SHEET 1 OF 1



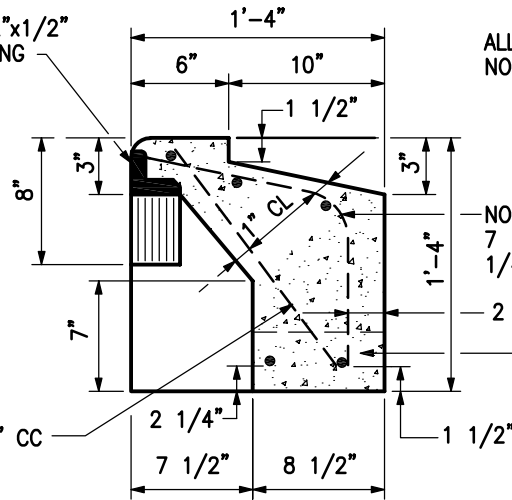
NOTES:

1. INLET MAY BE CONSTRUCTED OF BRICK, CAST IN PLACE OR PRECAST CONCRETE. SEE TABLE FOR CONCRETE AND STEEL REQUIREMENTS. SEE LATEST DPW SPEC FOR INLETS.
2. TOP 4" OF CONCRETE WALLS MAY BE BRICK MASONRY TO BRING GRATE TO REQUIRED GRADE.
3. PLACE 1/4" EXPANSION MATERIAL BETWEEN FRAME AND ABUTTING RIGID PAVEMENT, AND BETWEEN ENDS OF INLET CURB AND NORMAL CURB.
4. IF 6" MIX 1 CONCRETE IS USED AS FOUNDATION FOR BRICK INLET, PLACE NO. 4 DEFORMED BARS AT 12" CC BOTH WAYS, 2" CLEAR FROM TOP.
5. REINFORCEMENT REQUIRED ON OUTSIDE, AS WELL AS ON INSIDE OF WALLS, WHEN "A" IS GREATER THAN 8'-0". BAR SPACING SAME AS FOR INSIDE WALL.
6. DEPTH OF INLET CONNECTION IN STREETS AT CURB LINE TO BE 52" FROM INVERT TO ESTABLISHED GRADE. NO DEVIATION FROM THE 52" DEPTH WILL BE CONSIDERED FOR PAYMENT UNLESS DIRECTED BY THE ENGINEER IN WRITING.

	APPROVED:  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED 3 / 2008	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	TYPE 'S' COMBINATION INLET DOUBLE GRATE TANDEM	STANDARD NO. BC 380.51		
		SCALE: NONE		SHEET 1 OF 1	

GALVANIZED
L 2 1/2"x2 1/2"x1/2"
x6'-10 1/2" LONG

NO. 4 - 12" CC



ALL LONGITUDINAL BARS
NO. 4x6'-10" LONG (5 REQUIRED)

— NO. 4 ANCHOR BARS, 24" CC 4 REQUIRED BEGINNING 7 1/2" FROM ANGLE END. FASTENED TO ANGLE WITH 1/4" FILLET WELD ALL AROUND BEFORE GALVANIZING.

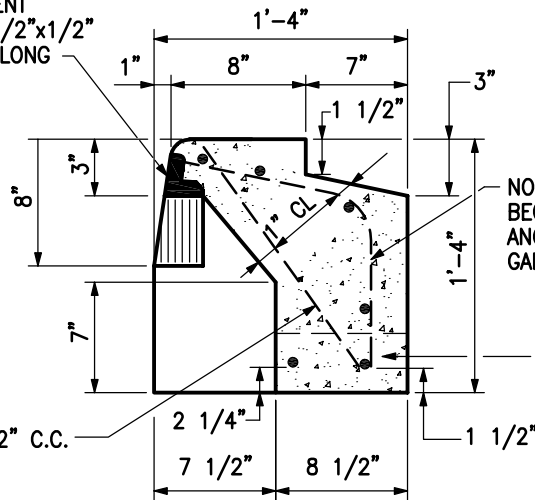
— 2 1/2" CL

— MIX 3 CONCRETE

SECTION A-A
(VERTICAL FACE)

GALVANIZED BENT
L 2 1/2"x2 1/2"x1/2"
x6'-10 1/2" LONG

NO. 4 - 12" C.C.

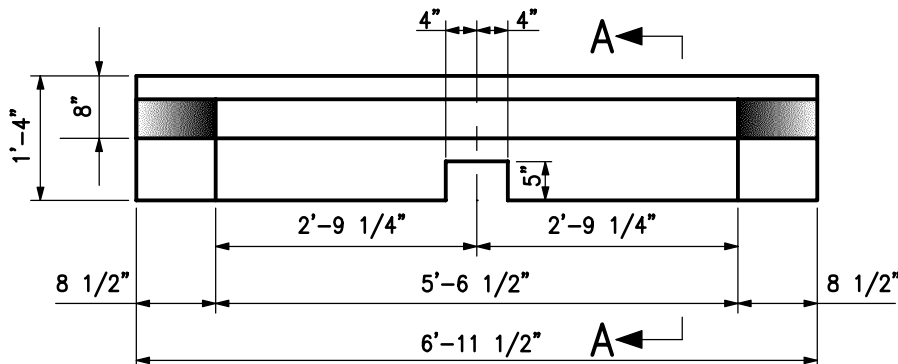


ALL LONGITUDINAL BARS
NO. 4 - 6'-10" LONG (5 REQUIRED)

— NO. 4 ANCHOR BARS, 24" CC - 4 REQUIRED BEGINNING 7 1/2" FROM ANGLE END. FASTENED TO ANGLE WITH 1/4" FILLET WELD ALL AROUND BEFORE GALVANIZING.

— MIX 3 CONCRETE

SECTION A-A
(BATTERED FACE)



ELEVATION



APPROVED :

HEAD, BUREAU OF WATER AND WASTEWATER

DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

PRECAST SPECIAL CURB TYPE 'S'
COMBINATION INLET
DOUBLE GRATE TANDEM

ISSUED

REVISED

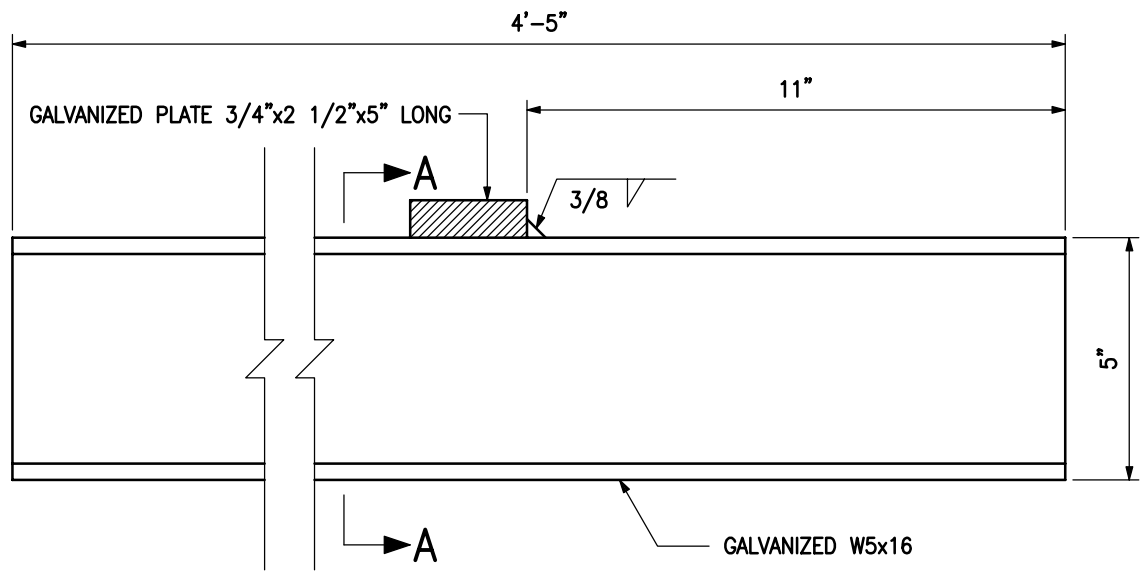
REVISED

3 / 2008

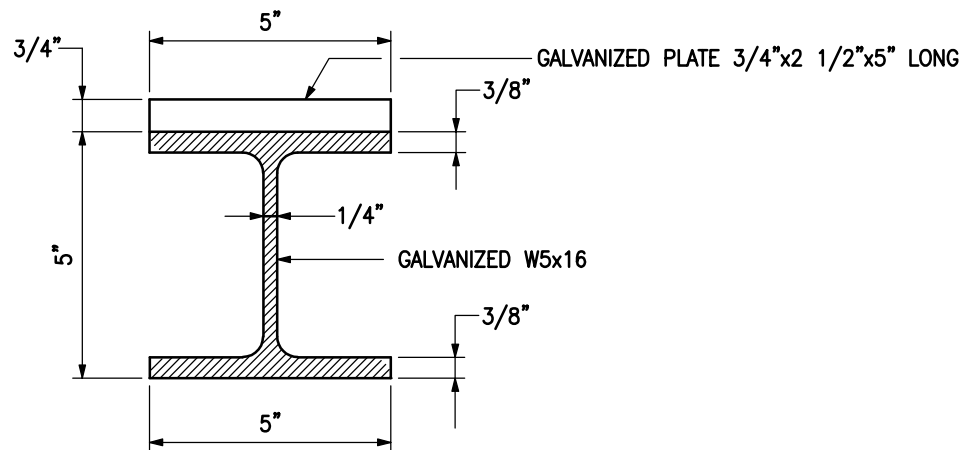
STANDARD NO.
BC 380.52

SCALE : NONE



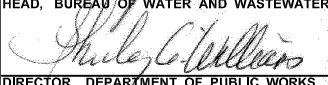
SHEET 1 OF 1

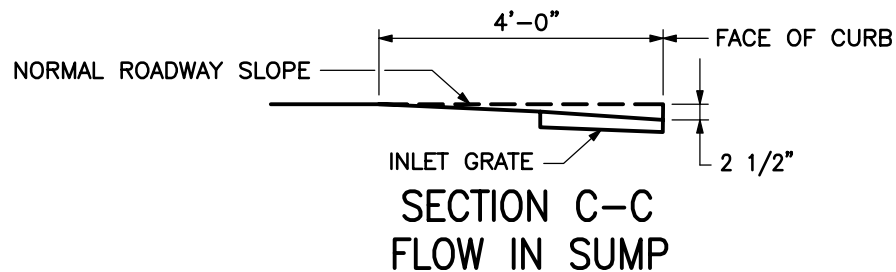
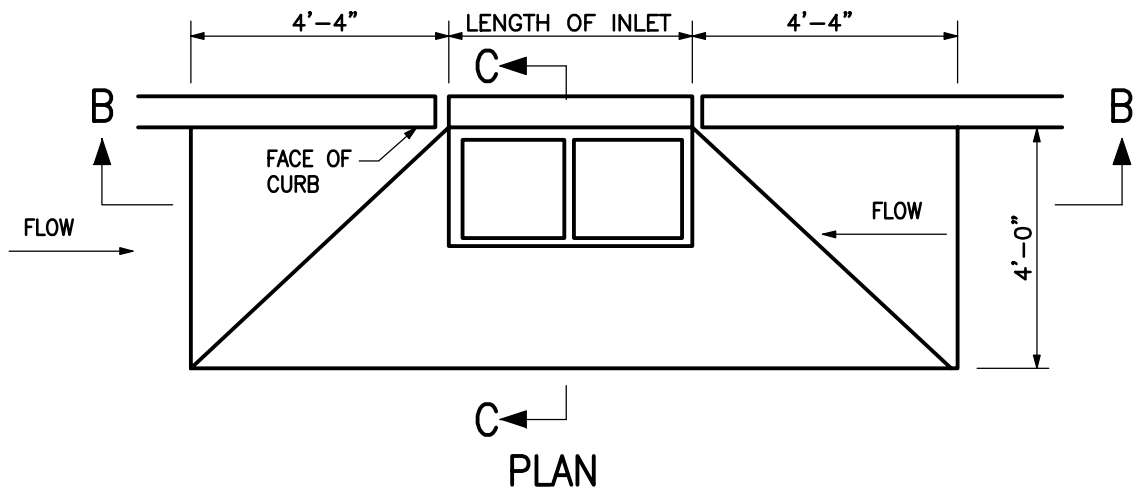
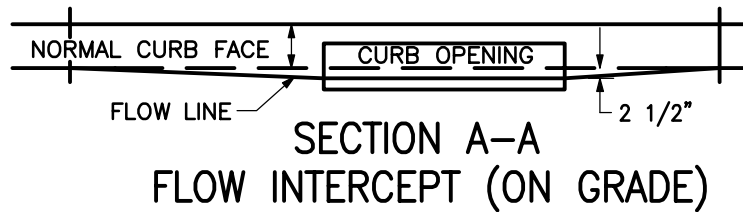
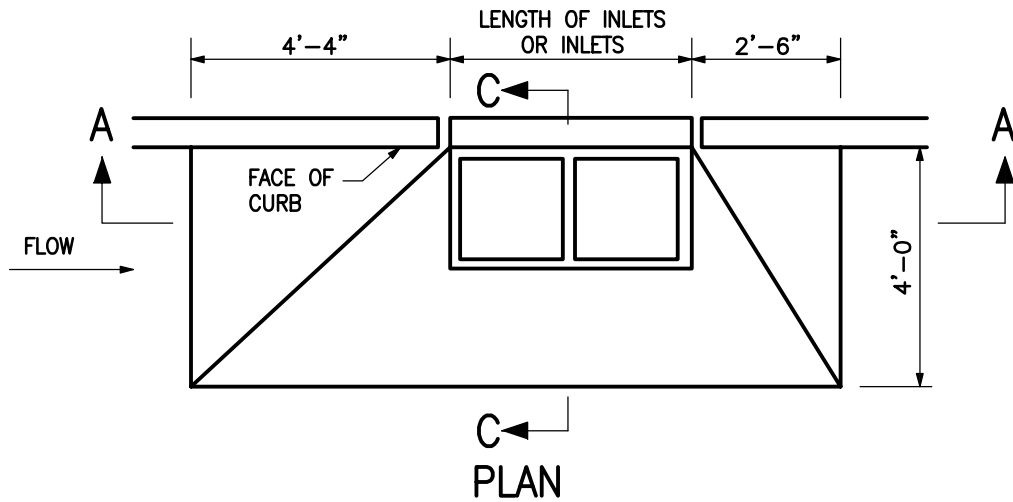


ELEVATION



SECTION A-A

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED 3 / 2008	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	BEAM AND PLATE DETAIL TYPE 'S' COMBINATION INLET DOUBLE GRATE TANDEM	STANDARD NO. BC 380.53		
			SCALE : NONE	SHEET 1 OF 1	



APPROVED :

[Signature]

HEAD, BUREAU OF WATER AND WASTEWATER

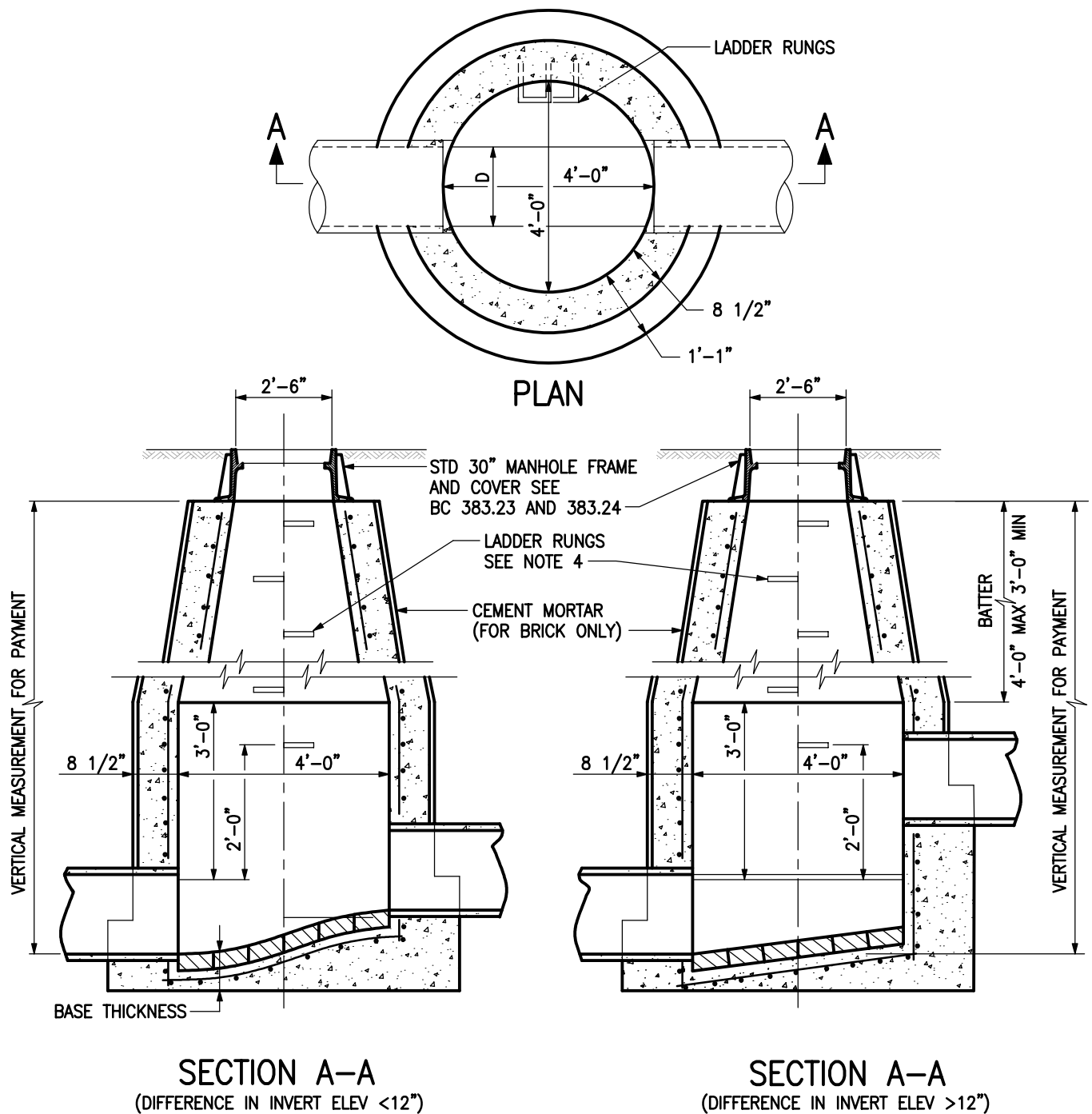
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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

METHOD OF DEPRESSING
PAVING AT INLETS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 380.99		
SCALE : NONE		SHEET 1 OF 1



NOTES:

1. MANHOLE SHALL BE CONSTRUCTED OF REINFORCED CONCRETE (MIX 2). REINFORCING TO BE NO. 4 DEFORMED BARS @ 6" CC BOTH WAYS, 2" COVER. BRICK AND MORTAR MAY ALSO BE USED.
2. MANHOLE WALL THICKNESS: 8" TO DEPTH OF 12'-0" 12" (BELOW DEPTH OF 12'-0" TO DEPTH OF 24'-0")
3. MANHOLE BASE THICKNESS: 8" WALL-USE 12" BASE 12" WALL-USE 15" BASE
4. LADDER RUNGS SHALL BE INSTALLED IN STAGGERED ALIGNMENT AT 1'-3" TYPICAL C/C. RUNG TYPE SHALL BE IN ACCORDANCE WITH STANDARD BC 383.92 OR 383.93. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
5. BENCH AND CHANNEL TO BE CONSTRUCTED OF ONE COURSE OF SEWER BRICK ON EDGE. BENCH TO SLOPE A MINIMUM OF 1" PER FOOT TOWARDS CHANNEL.
6. BENCH HEIGHT ABOVE OUTGOING PIPE INVERT TO BE EQUAL TO ONE HALF DIAMETER OF THE OUTGOING PIPE OR AS DIRECTED BY THE ENGINEER.
7. CHANNEL TO THE SLOPE 1/4 INCH PER FOOT TOWARDS OUTLET OR AS DIRECTED BY THE ENGINEER.



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

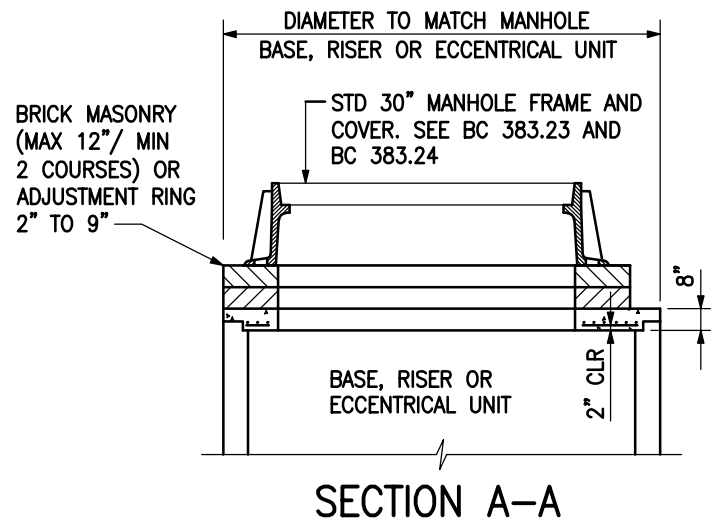
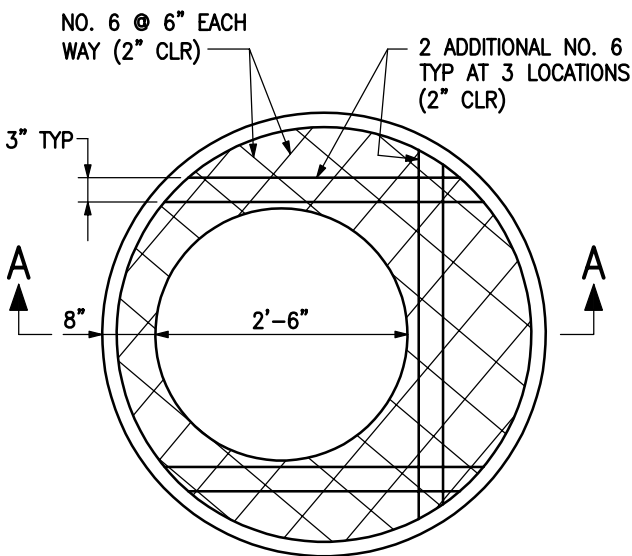
BRICK OR CAST IN PLACE
 STANDARD STORM
 MANHOLE

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 383.02

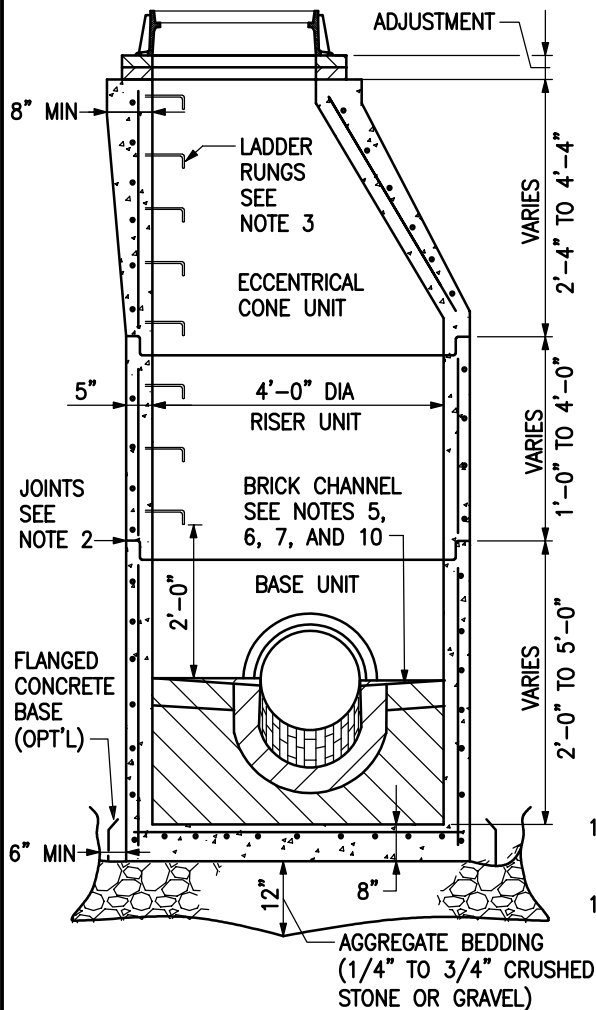
SCALE : NONE

SHEET 1 OF 1



OPTIONAL FLAT SLAB TOP

(SHOWN WITHOUT MANHOLE FRAME AND CLOVER - SEE NOTE 9)



SECTION

NOTES:

1. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO "PRECAST REINFORCED CONCRETE MANHOLE SECTION ASTM DESIGNATION C-478, LATEST REVISIONS".
2. MANHOLE SECTIONS MANUFACTURED ACCORDING TO ASTM C-478 AND AASHTO M199. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATER TIGHT USING 'O' RING RUBBER GASKETS AND PROFILE JOINTS MEETING ASTM C-443 AND C-361. FLEXIBLE PLASTIC GASKET TO MEET AASHTO M198 TYPE B.
3. LADDER RUNGS SHALL BE INSTALLED IN STAGGERED ALIGNMENT AT 1'-3" TYPICAL CC. RUNG TYPE SHALL BE IN ACCORDANCE WITH STANDARD BC 383.92 OR 383.93. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
4. LIFT EYES OR LIFT INSERTS SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
5. BENCH AND CHANNEL TO BE CONSTRUCTED OF ONE COURSE OF SEWER BRICK ON EDGE. BENCH TO SLOPE A MINIMUM OF 1" PER FOOT TOWARDS CHANNEL.
6. BENCH HEIGHT ABOVE OUTGOING PIPE INVERT TO BE EQUAL TO ONE HALF DIAMETER OF THE OUTGOING PIPE OR AS DIRECTED BY THE ENGINEER.
7. CHANNEL TO THE SLOPE 1/4 INCH PER FOOT TOWARDS OUTLET OR AS DIRECTED BY THE ENGINEER.
8. USE NON-SHRINK GROUT JOINT FILLER.
9. USE FLAT SLAB TOP WHEN MANHOLE LENGTH IS NOT SUFFICIENT FOR ECCENTRIC CONE UNIT.
10. VERTICAL MEASUREMENT FOR PAYMENT SHALL BE FROM THE INVERT OF THE OUTGOING PIPE TO THE BOTTOM OF THE MANHOLE FRAME.
11. MATERIAL PROPERTIES: CONCRETE SHALL BE MIX 6, WWF PER ASTM A135, REBAR PER ASTM A615 GRADE 60.



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

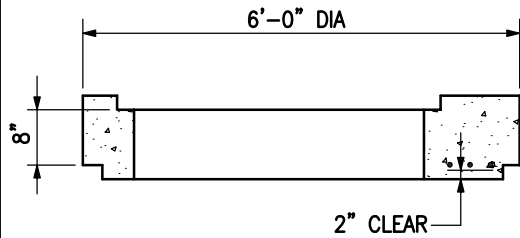
48" DIA PRECAST
 STORM MANHOLE FOR
 15" TO 24" PIPES

ISSUED	REVISED	REVISED
3 / 2008		

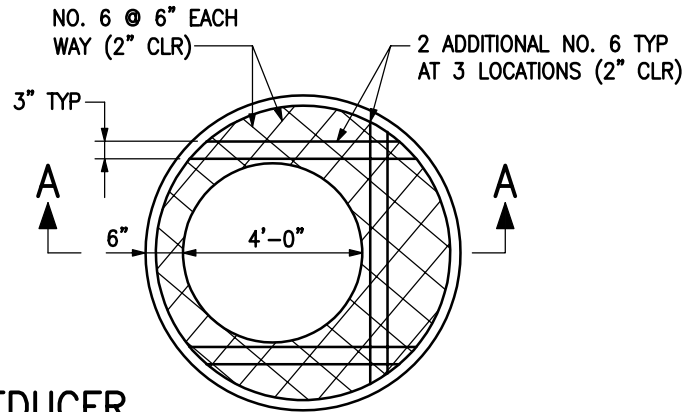
STANDARD NO.
 BC 383.04

SCALE : NONE

SHEET 1 OF 1

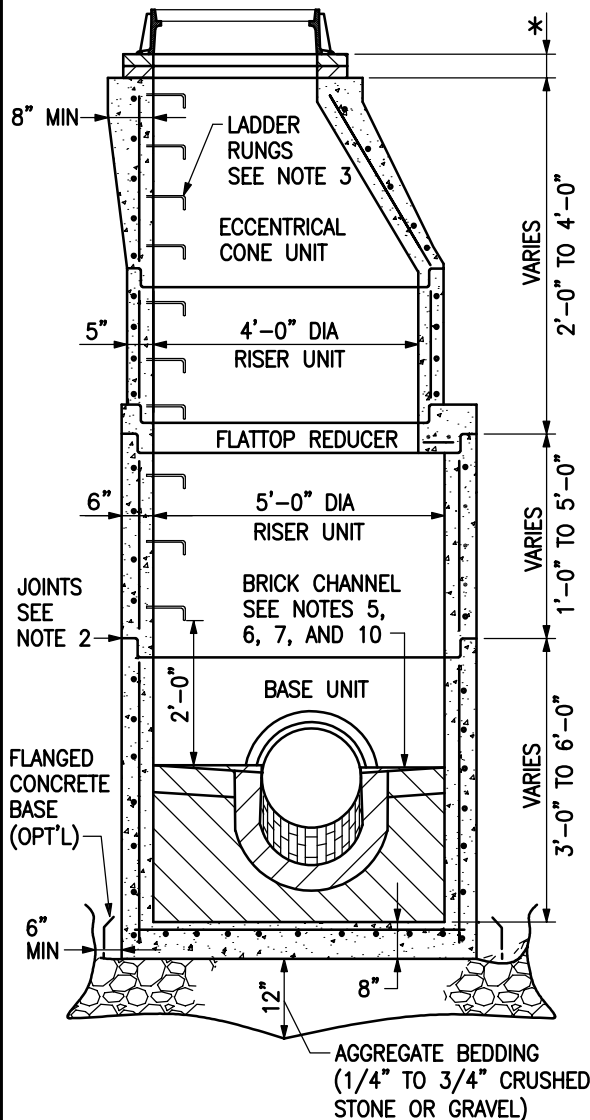


SECTION A-A



PLAN

* ADJUSTMENT - SEE SECTION A-A
ON BC 383.04



SECTION

NOTES:

1. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO "PRECAST REINFORCED CONCRETE MANHOLE SECTION ASTM DESIGNATION C-478, LATEST REVISIONS".
2. MANHOLE SECTIONS MANUFACTURED ACCORDING TO ASTM C-478 AND AASHTO M199. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATER TIGHT USING 'O' RING RUBBER GASKETS AND PROFILE JOINTS MEETING ASTM C-443 AND C-361. FLEXIBLE PLASTIC GASKET TO MEET AASHTO M198 TYPE B.
3. LADDER RUNGS SHALL BE INSTALLED IN STAGGERED ALIGNMENT AT 1'-3" TYPICAL CC. RUNG TYPE SHALL BE IN ACCORDANCE WITH STANDARD BC 383.92 OR 383.93. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
4. LIFT EYES OR LIFT INSERTS SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
5. BENCH AND CHANNEL TO BE CONSTRUCTED OF ONE COURSE OF SEWER BRICK ON EDGE. BENCH TO SLOPE A MINIMUM OF 1" PER FOOT TOWARDS CHANNEL.
6. BENCH HEIGHT ABOVE OUTGOING PIPE INVERT TO BE EQUAL TO ONE HALF DIAMETER OF THE OUTGOING PIPE OR AS DIRECTED BY THE ENGINEER.
7. CHANNEL TO THE SLOPE 1/4 INCH PER FOOT TOWARDS OUTLET OR AS DIRECTED BY THE ENGINEER.
8. USE NON-SHRINK GROUT JOINT FILLER.
9. USE FLAT SLAB TOP WHEN MANHOLE LENGTH IS NOT SUFFICIENT FOR ECCENTRIC CONE UNIT.
10. VERTICAL MEASUREMENT FOR PAYMENT SHALL BE FROM THE INVERT OF THE OUTGOING PIPE TO THE BOTTOM OF THE MANHOLE FRAME.
11. MATERIAL PROPERTIES: CONCRETE SHALL BE MIX 6, WWF PER ASTM A135, REBAR PER ASTM A615 GRADE 60.
12. FLATTOP REDUCER REINFORCEMENT TO CONSIST OF REBAR SPACING AS SHOWN OR TWO CONTINUOUS CAGES WITH ONE WIRE PER CAGE INSIDE AND OUTSIDE WIRE AREA 0.12 PER ASTM A185.



APPROVED :
[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

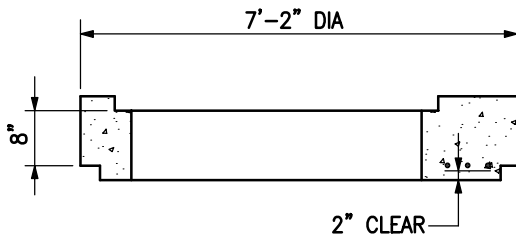
60" DIA PRECAST
STORM MANHOLE FOR
27" TO 36" PIPES

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 383.05

SCALE : NONE

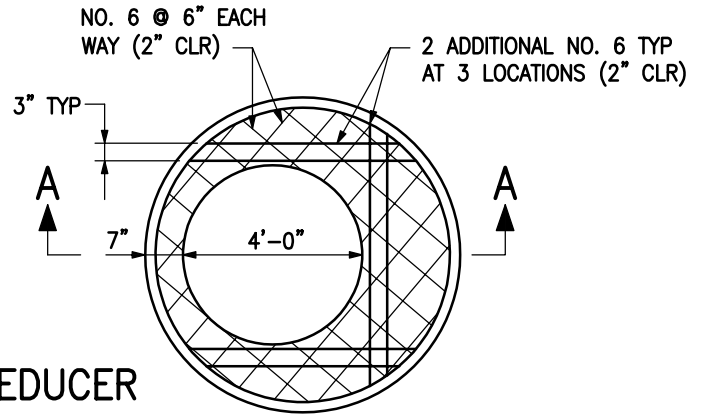
SHEET 1 OF 1



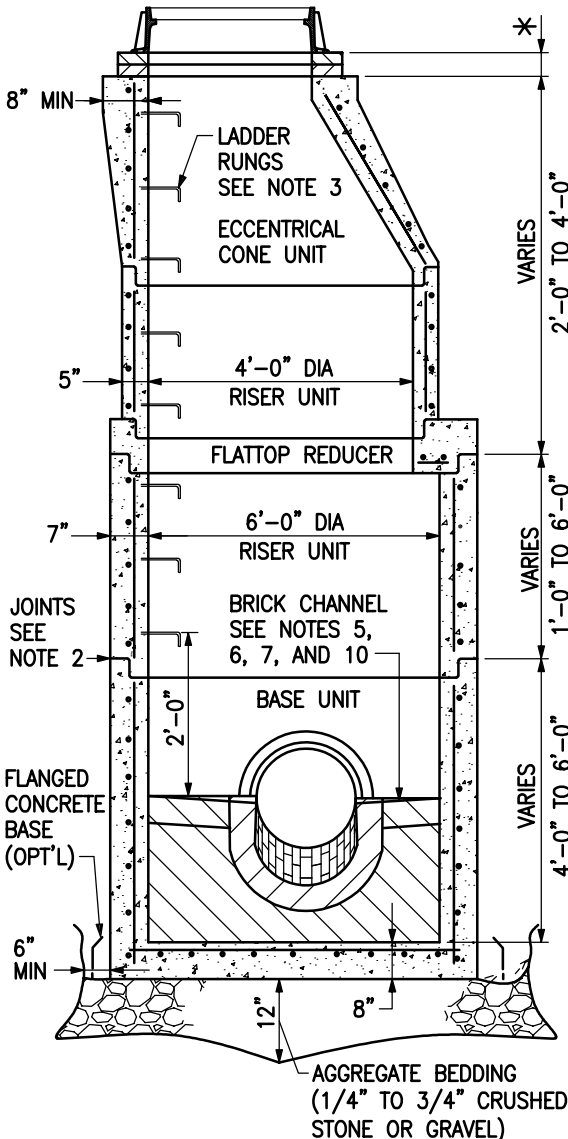
SECTION A-A

FLATTOP REDUCER

* ADJUSTMENT - SEE SECTION A-A
ON BC 383.04



PLAN



SECTION

NOTES:

1. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO "PRECAST REINFORCED CONCRETE MANHOLE SECTION ASTM DESIGNATION C-478, LATEST REVISIONS".
2. MANHOLE SECTIONS MANUFACTURED ACCORDING TO ASTM C-478 AND AASHTO M199. THE JOINTS SHALL BE SEALED BY THE CONTRACTOR AND MADE WATER TIGHT USING 'O' RING RUBBER GASKETS AND PROFILE JOINTS MEETING ASTM C-443 AND C-361. FLEXIBLE PLASTIC GASKET TO MEET AASHTO M198 TYPE B.
3. LADDER RUNGS SHALL BE INSTALLED IN STAGGERED ALIGNMENT AT 1'-3" TYPICAL CC. RUNG TYPE SHALL BE IN ACCORDANCE WITH STANDARD BC 383.92 OR 383.93. LADDER RUNGS SHALL BE INCIDENTAL TO THE COST OF THE MANHOLE.
4. LIFT EYES OR LIFT INSERTS SHALL BE PROVIDED IN EACH SECTION FOR HANDLING.
5. BENCH AND CHANNEL TO BE CONSTRUCTED OF ONE COURSE OF SEWER BRICK ON EDGE. BENCH TO SLOPE A MINIMUM OF 1" PER FOOT TOWARDS CHANNEL.
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7. CHANNEL TO THE SLOPE 1/4 INCH PER FOOT TOWARDS OUTLET OR AS DIRECTED BY THE ENGINEER.
8. USE NON-SHRINK GROUT JOINT FILLER.
9. USE FLAT SLAB TOP WHEN MANHOLE LENGTH IS NOT SUFFICIENT FOR ECCENTRIC CONE UNIT.
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11. MATERIAL PROPERTIES: CONCRETE SHALL BE MIX 6, WWF PER ASTM A135, REBAR PER ASTM A615 GRADE 60.
12. FLATTOP REDUCER REINFORCEMENT TO CONSIST OF REBAR SPACING AS SHOWN OR TWO CONTINUOUS CAGES WITH ONE WIRE PER CAGE INSIDE AND OUTSIDE WIRE AREA 0.12 PER ASTM A185.



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
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BUREAU OF WATER AND WASTEWATER

72" DIA PRECAST
STORM MANHOLE FOR
42" TO 48" PIPES

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 383.06

SCALE : NONE

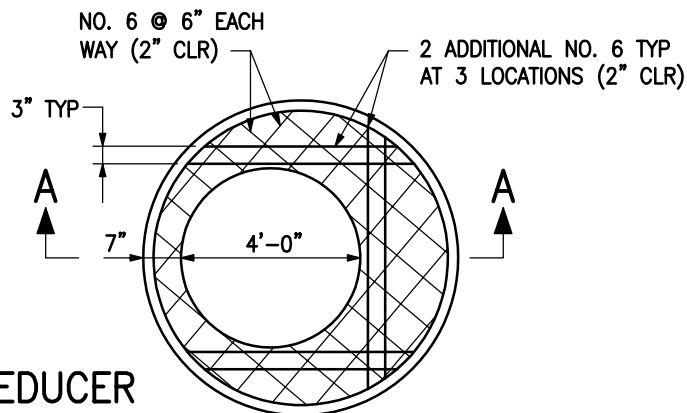
SHEET 1 OF 1



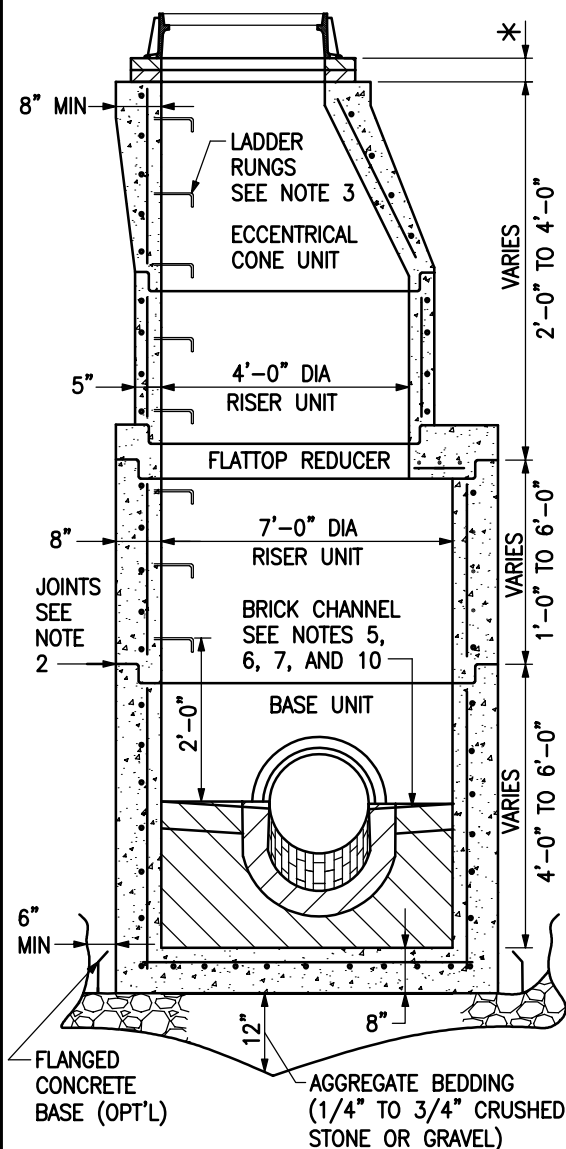
SECTION A-A

FLATTOP REDUCER

* ADJUSTMENT - SEE SECTION A-A
ON BC 383.04



PLAN



SECTION

NOTES:

1. MANHOLE DESIGN SPECIFICATIONS SHALL CONFORM TO "PRECAST REINFORCED CONCRETE MANHOLE SECTION ASTM DESIGNATION C-478, LATEST REVISIONS".
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12. FLATTOP REDUCER REINFORCEMENT TO CONSIST OF REBAR SPACING AS SHOWN OR TWO CONTINUOUS CAGES WITH ONE WIRE PER CAGE INSIDE AND OUTSIDE WIRE AREA 0.12 PER ASTM A185.



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[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

84" DIA PRECAST
STORM MANHOLE FOR
54" TO 60" PIPES

ISSUED

REVISED

REVISED

3 / 2008

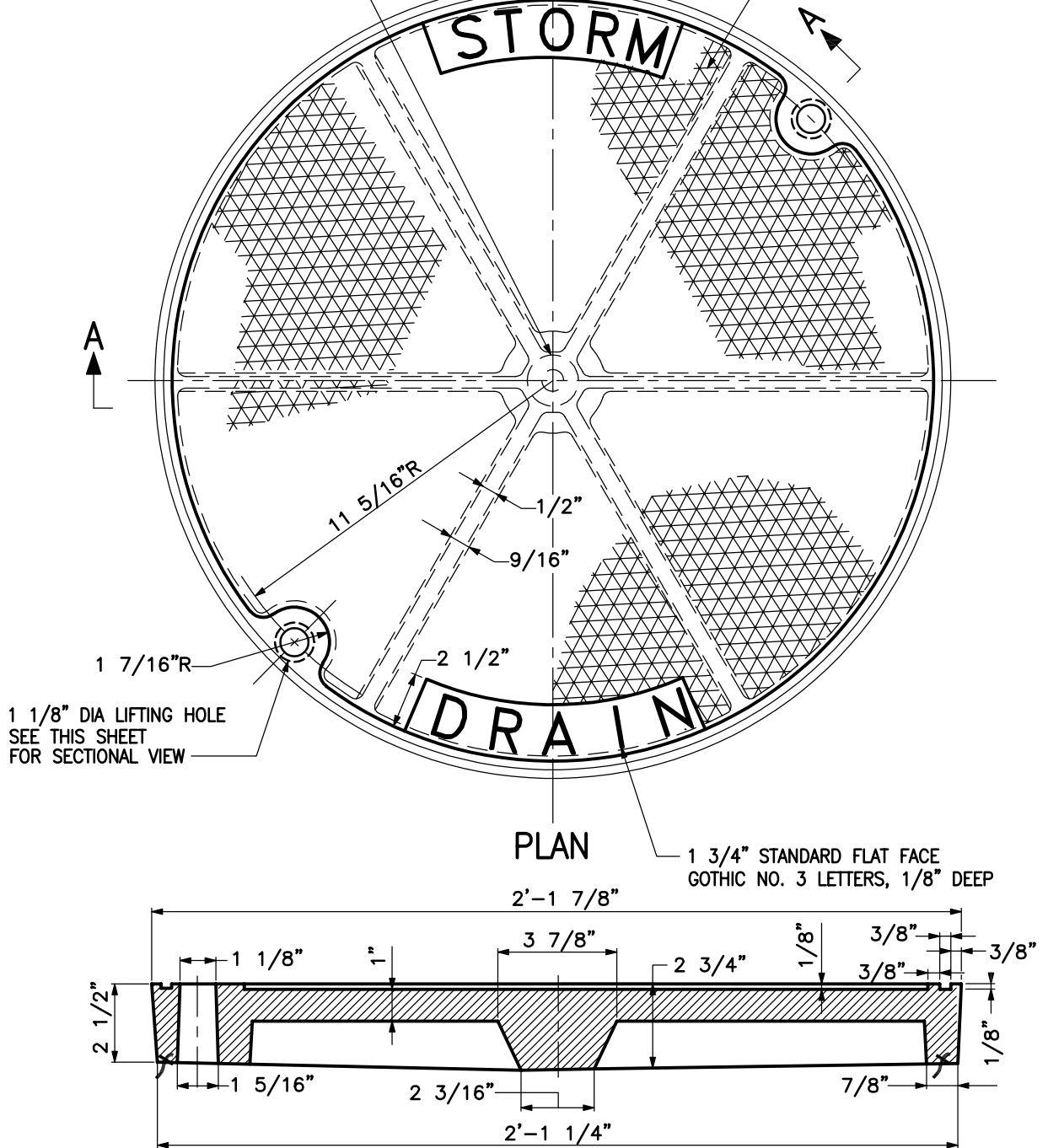
STANDARD NO.
BC 383.07

SCALE : NONE

SHEET 1 OF 1

PROVIDE HOLE FOR LOCKING BOLT
WHEN REQUIRED. FOR SIZE
SEE BC 383.25

STANDARD DIAMOND GRID



NOTES:

1. FOR STD 24" MANHOLE FRAME SEE BC 383.22
2. MATERIAL SHALL BE CAST GRAY IRON ASTM A-48, CLASS 35B
3. COVER SHALL MEET OR EXCEED AASHTO M 306 PROOF LOAD REQUIREMENTS.

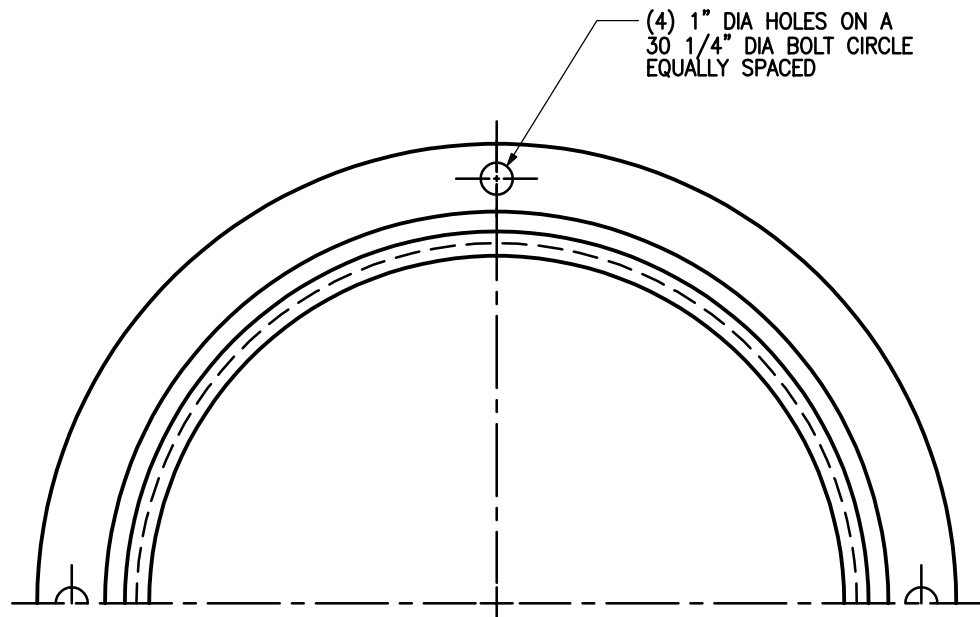


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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

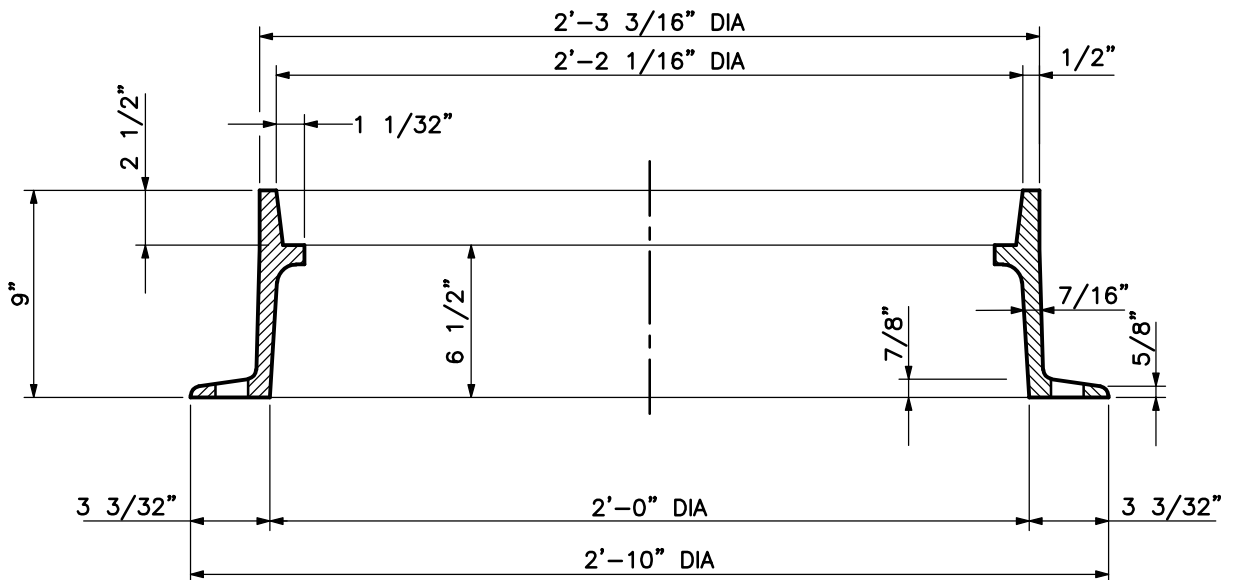
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 24 IN.
MANHOLE COVER

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.21		
SCALE : NONE		SHEET 1 OF 1



PARTIAL PLAN



SECTION

NOTES:

1. FOR 24" LOCK TYPE FRAME SEE BC 383.25
2. FOR STD 24" MANHOLE COVER SEE BC 383.21
3. MATERIAL SHALL BE CAST GRAY IRON ASTM A-48, CLASS 35B
4. FRAME SHALL MEET OR EXCEED AASHTO M 306 PROOF LOAD REQUIREMENTS.



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

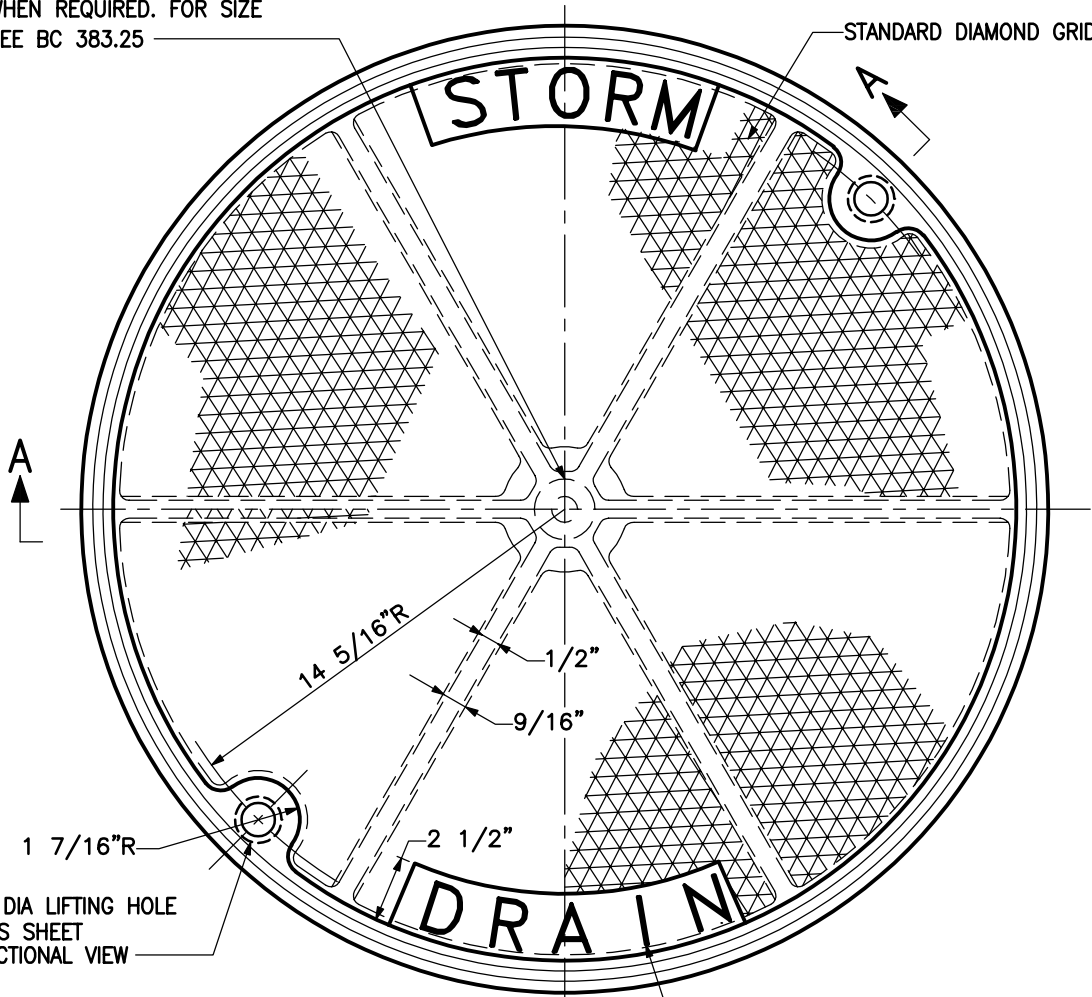
STANDARD 24 IN.
MANHOLE FRAME

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.22		
SCALE : NONE		SHEET 1 OF 1

PROVIDE HOLE FOR LOCKING BOLT
WHEN REQUIRED. FOR SIZE
SEE BC 383.25

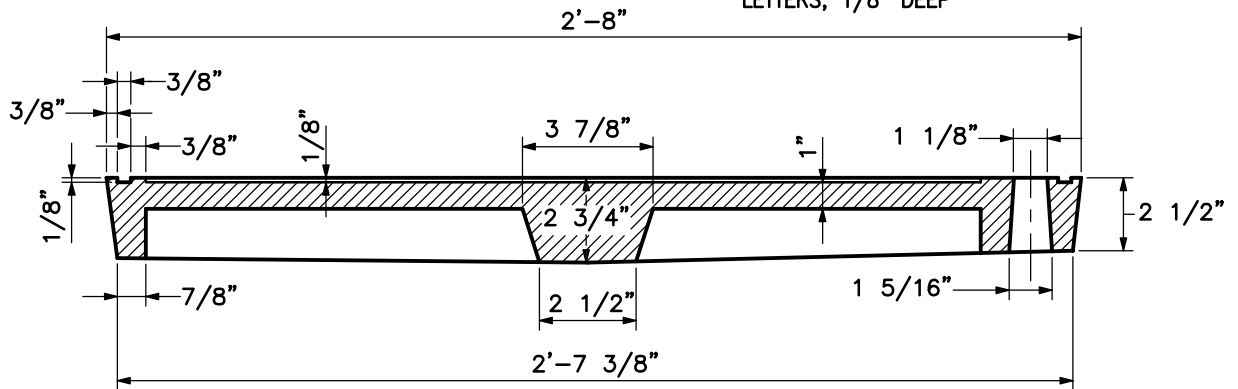
STANDARD DIAMOND GRID

1 1/8" DIA LIFTING HOLE
SEE THIS SHEET
FOR SECTIONAL VIEW



PLAN

1 3/4" STANDARD FLAT
FACE GOTHIC NO. 3
LETTERS, 1/8" DEEP



SECTION A-A

NOTES:

1. FOR STD 30" MANHOLE FRAME SEE BC 383.24
2. MATERIAL SHALL BE CAST GRAY IRON ASTM A-48, CLASS 35B
3. COVER SHALL MEET OR EXCEED AASHTO M 306 PROOF LOAD REQUIREMENTS.



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CITY OF BALTIMORE
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STANDARD 30 IN.
MANHOLE COVER

ISSUED

REVISED

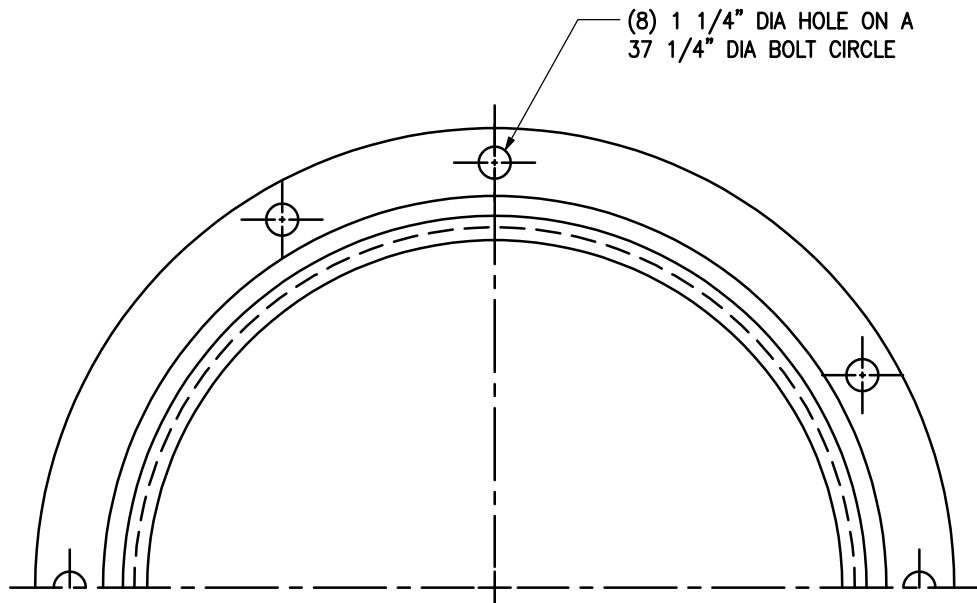
REVISED

3 / 2008

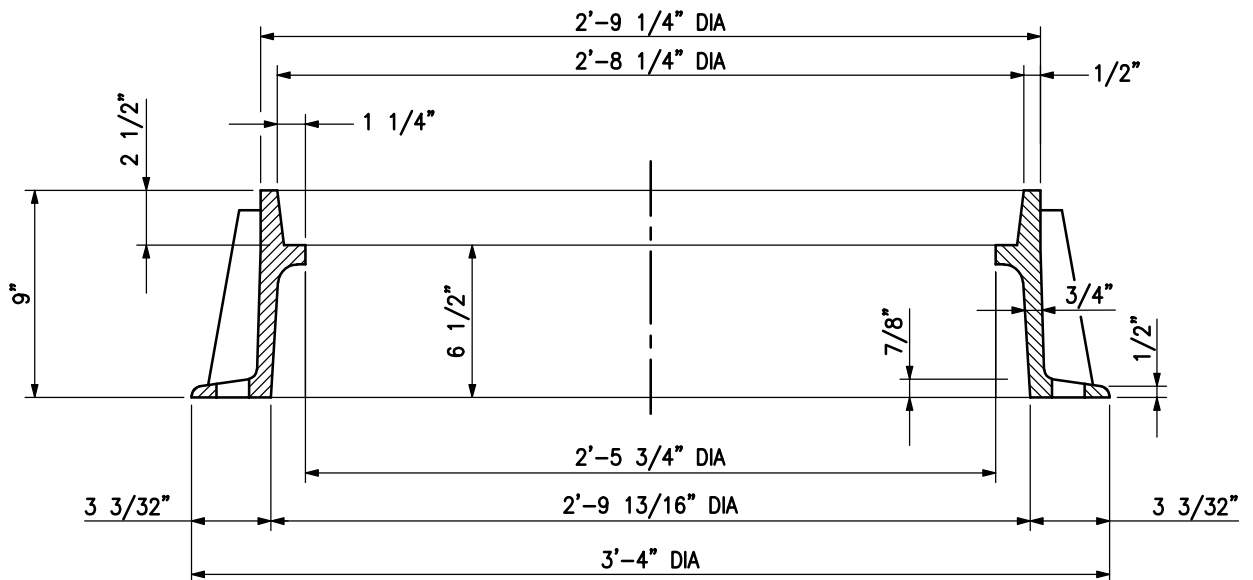
STANDARD NO.
BC 383.23

SCALE : NONE

SHEET 1 OF 1



PARTIAL PLAN



SECTION

NOTES:

1. FOR 30" LOCK TYPE FRAME SEE BC 383.25
2. FOR STD 30" MANHOLE COVER SEE BC 383.23
3. MATERIAL SHALL BE CAST GRAY IRON ASTM A-48, CLASS 35B
4. FRAME SHALL MEET OR EXCEED AASHTO M 306 PROOF LOAD REQUIREMENTS.

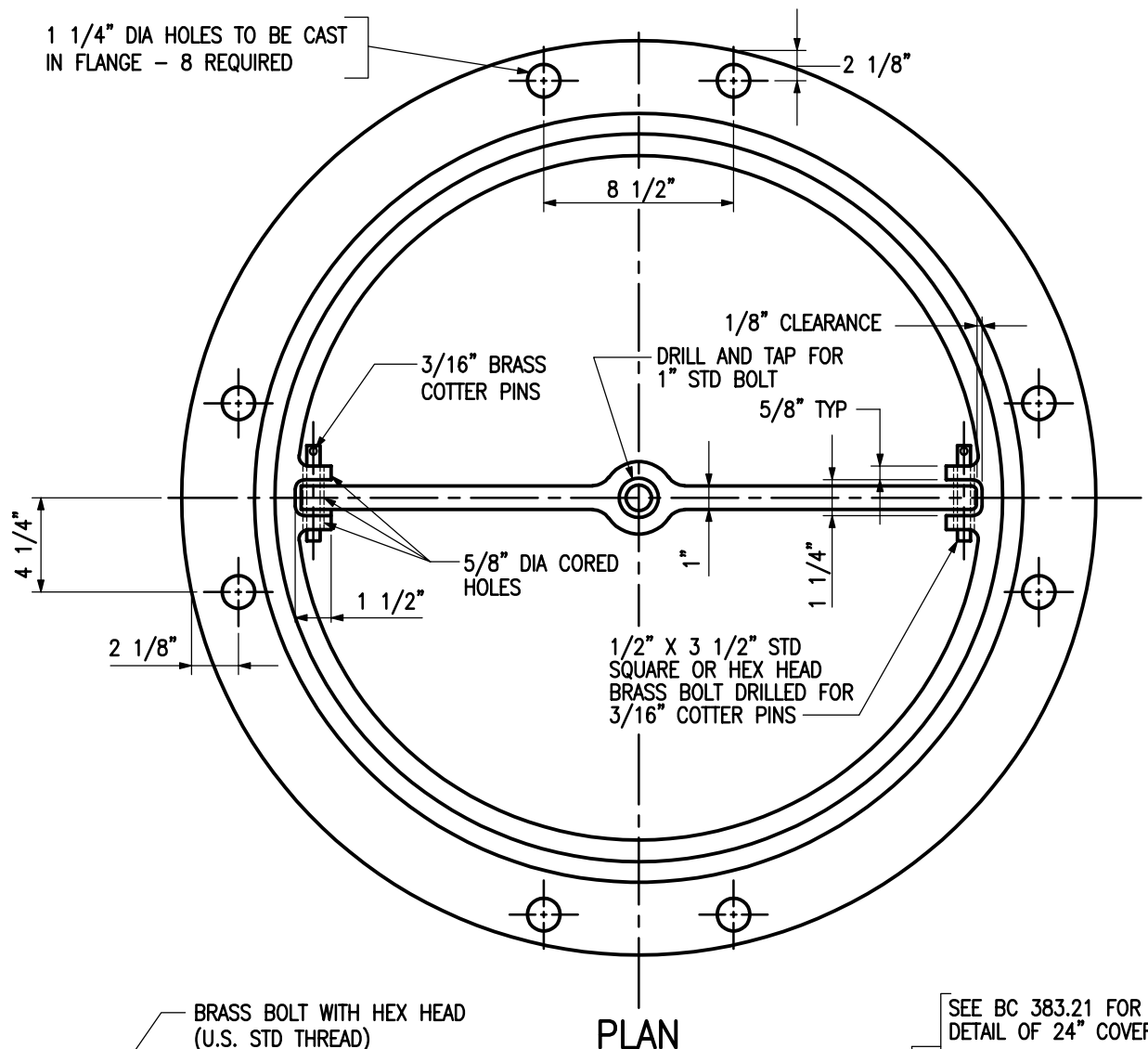


APPROVED :
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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

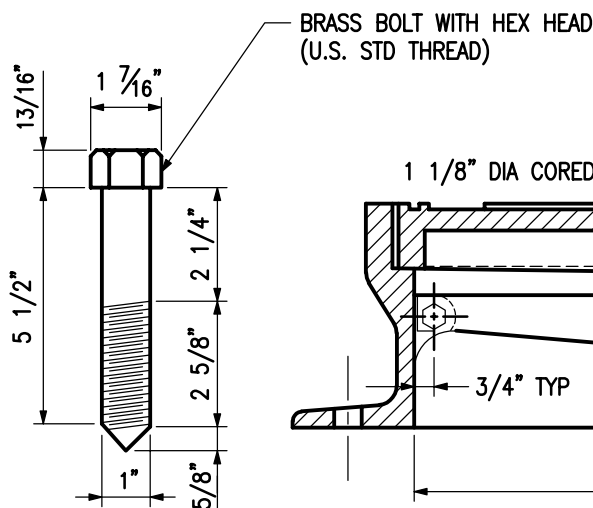
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 30 IN.
MANHOLE FRAME

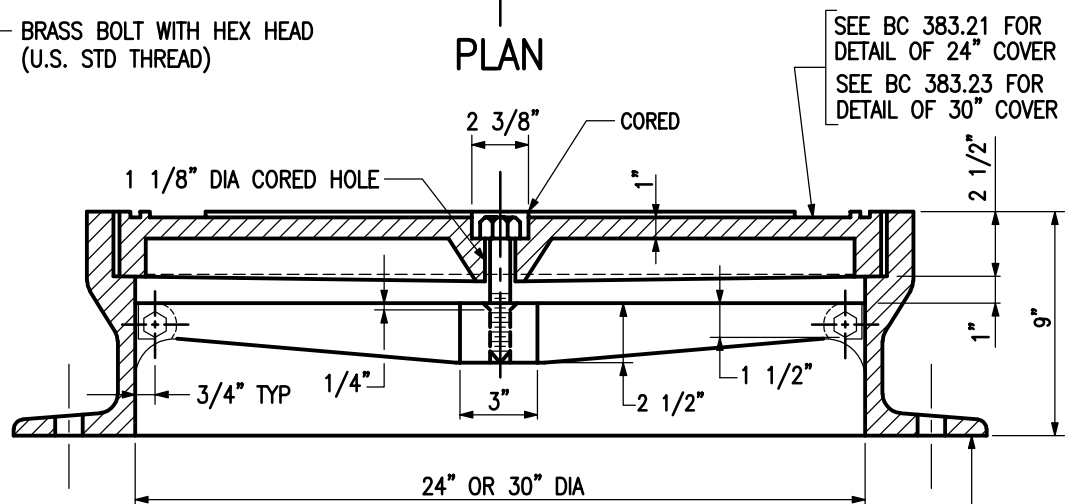
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.24		
SCALE : NONE		SHEET 1 OF 1



PLAN



BOLT



SECTION

SEE BC 383.22 FOR DETAIL OF 24" FRAME.
SEE BC 383.24 FOR DETAIL OF 30" FRAME.



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

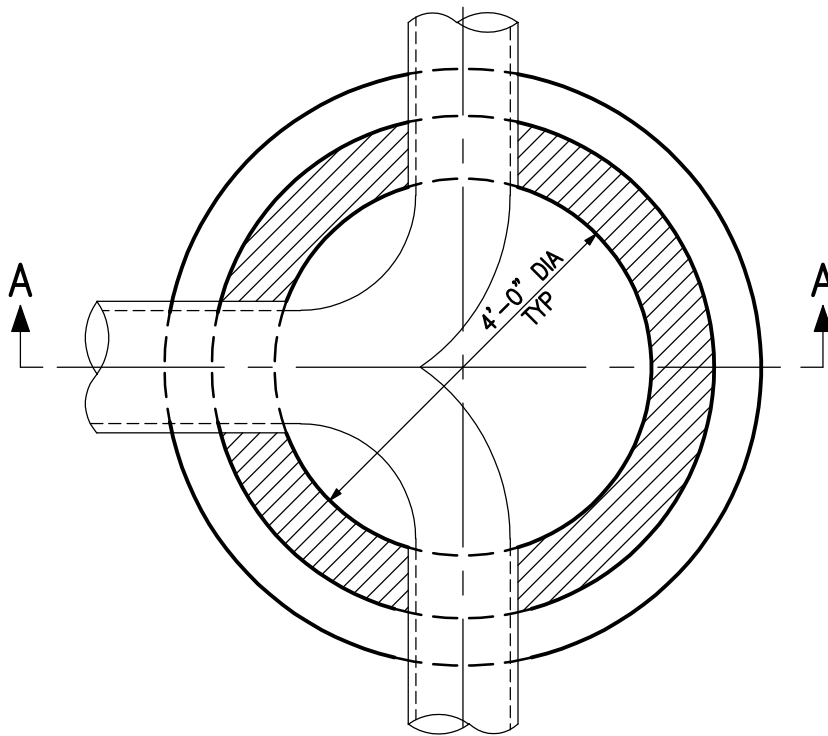
LOCKING DEVICE FOR
MANHOLE FRAME AND COVER

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 383.25

SCALE : NONE

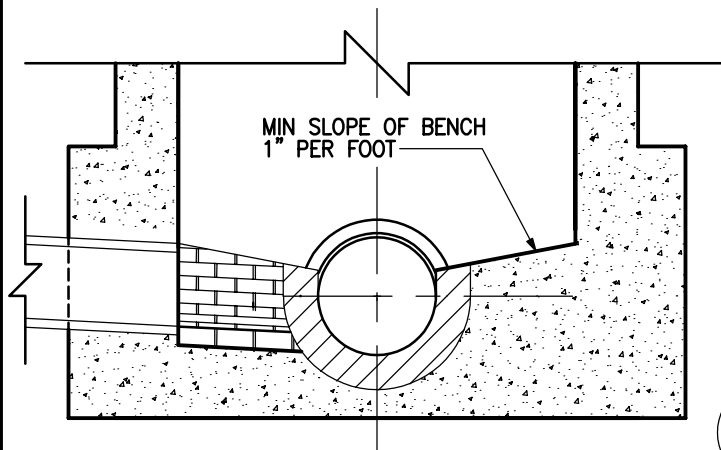
SHEET 1 OF 1



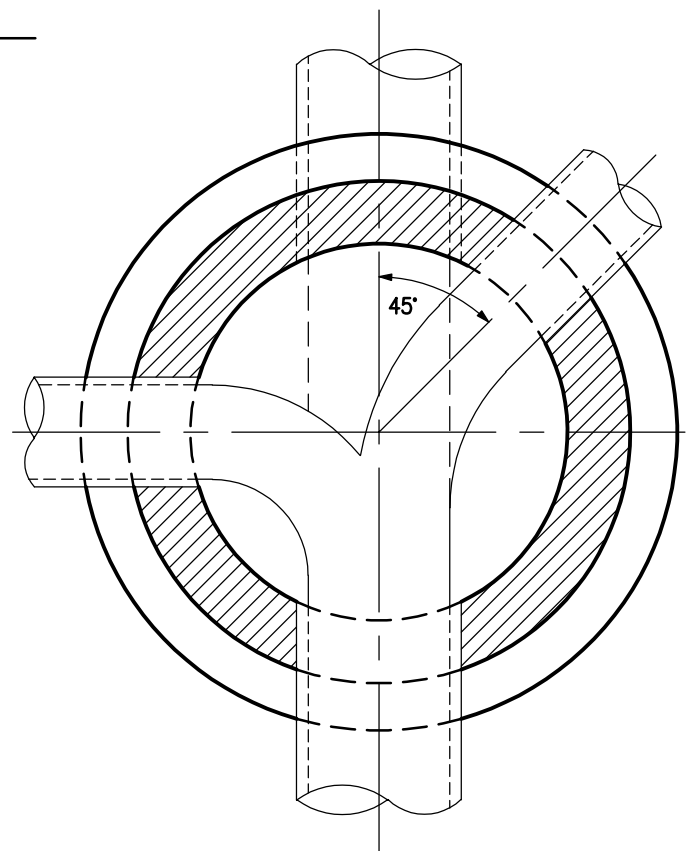
NOTE:

BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE

STANDARD CHANNEL NO. 1



SECTION A-A
(STANDARD CHANNEL NO. 1)



STANDARD CHANNEL NO. 2

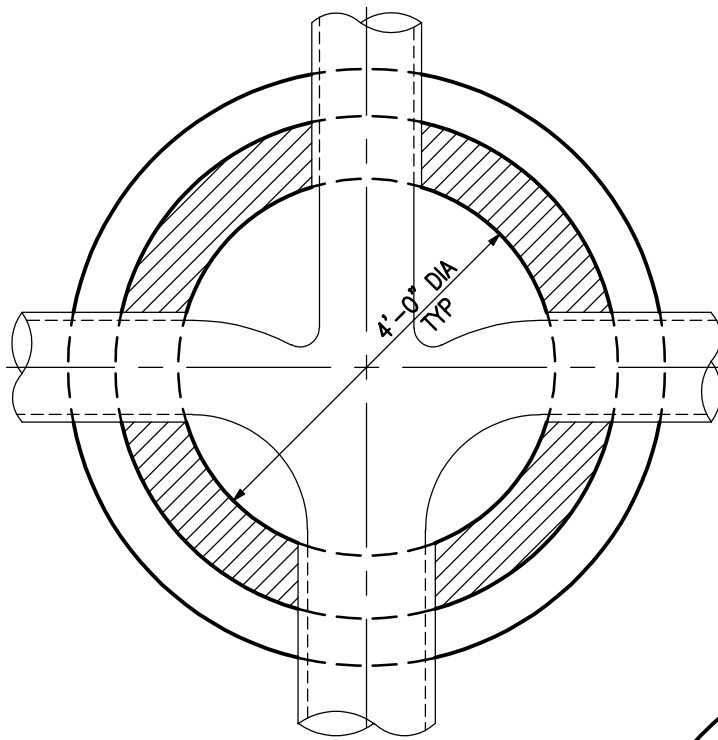


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[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPICAL MANHOLE CHANNELS
STANDARD CHANNEL NO. 1
STANDARD CHANNEL NO. 2

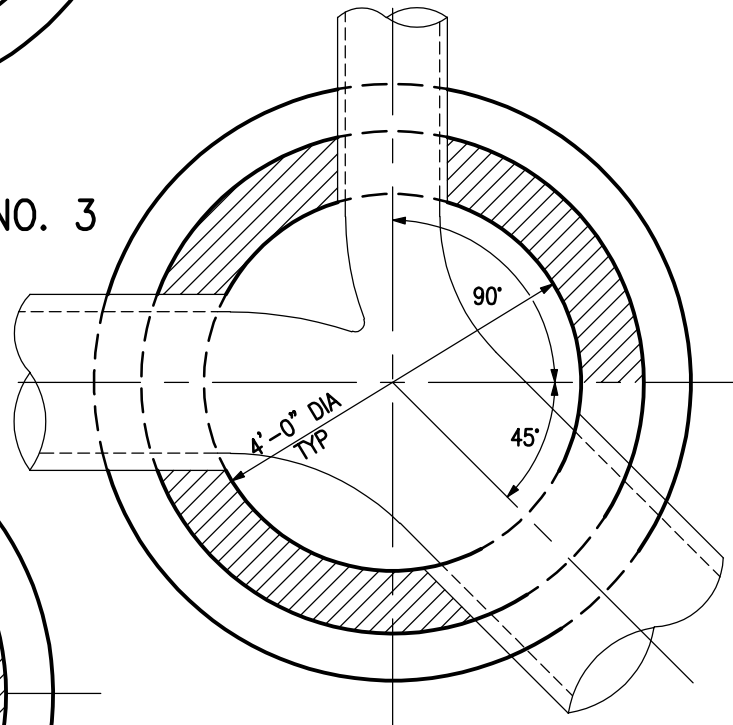
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.31		
SCALE : NONE		SHEET 1 OF 1



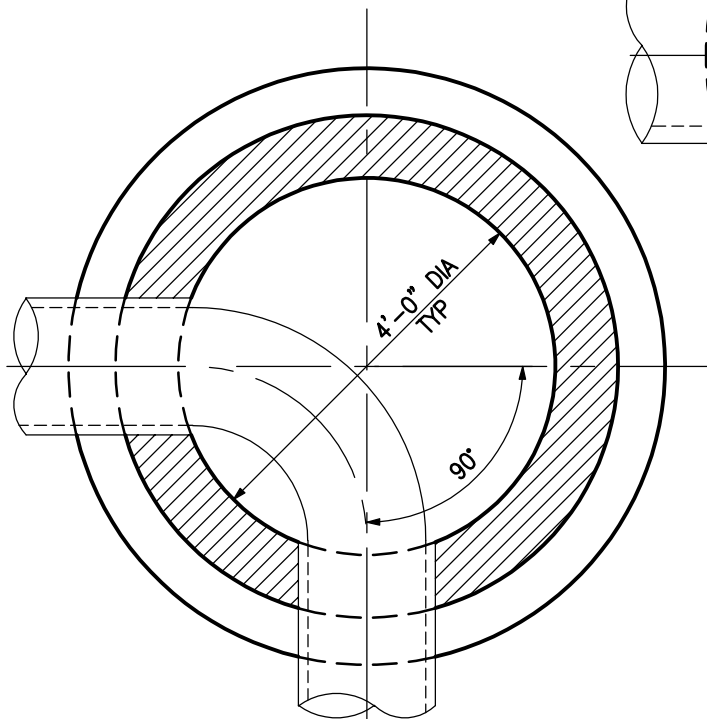
STANDARD CHANNEL NO. 3

NOTE:

BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE


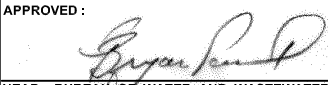



STANDARD CHANNEL NO. 4



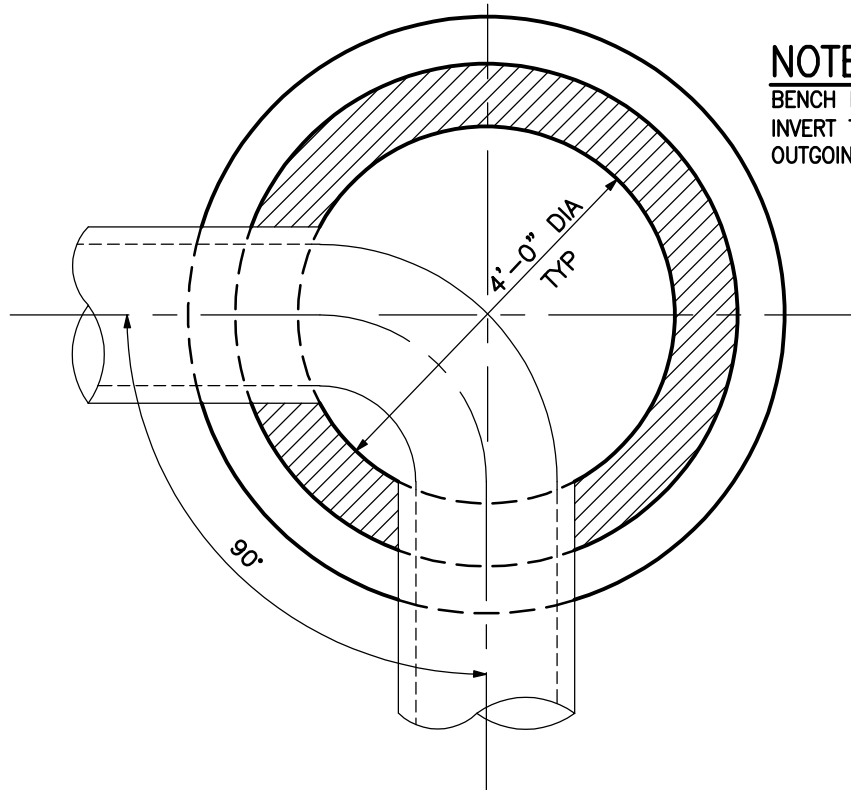
STANDARD CHANNEL NO. 5

(FOR 8", 10", 12", AND 15" PIPE SEWERS)

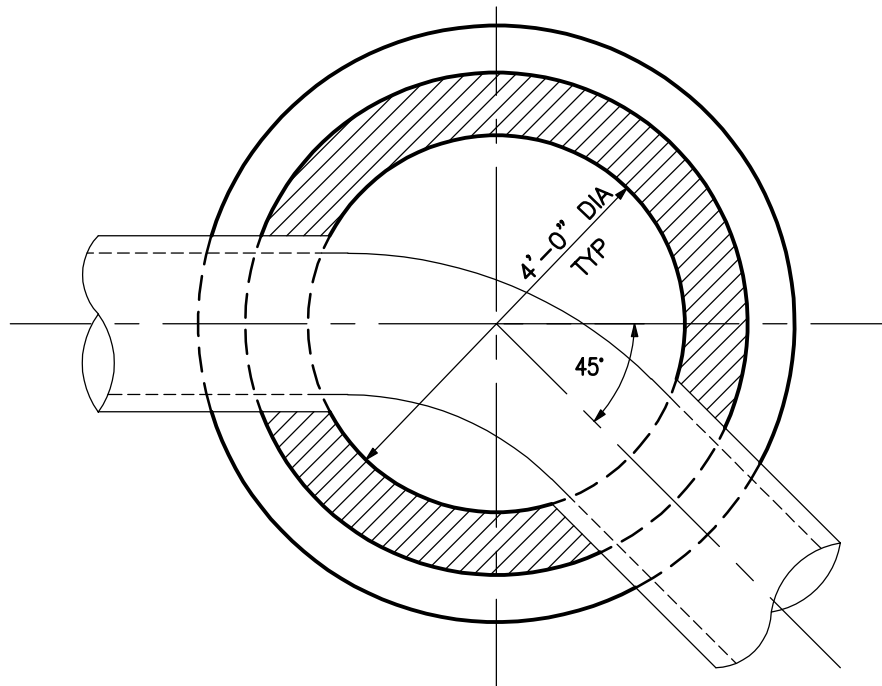
	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER TYPICAL MANHOLE CHANNELS STANDARD CHANNEL NO. 3 STANDARD CHANNEL NO. 4 STANDARD CHANNEL NO. 5	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 383.32		
			SCALE : NONE	SHEET 1 OF 1	

NOTE:

BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE



STANDARD CHANNEL NO. 6
(FOR 18", 21" AND 24" PIPE SEWERS)



STANDARD CHANNEL NO. 7

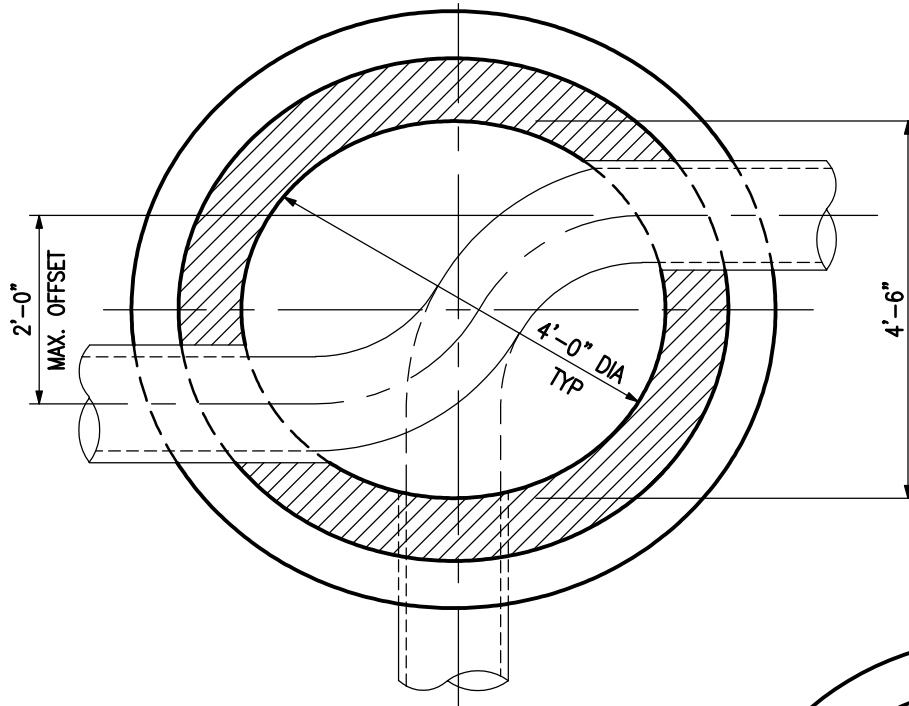


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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPICAL MANHOLE CHANNELS
STANDARD CHANNEL NO. 6
STANDARD CHANNEL NO. 7

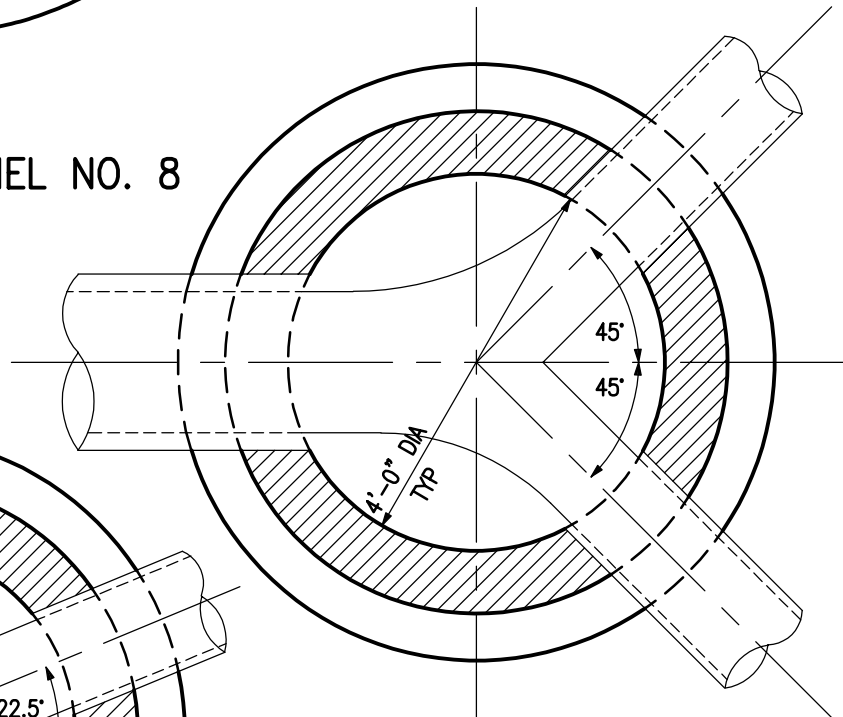
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.33		
SCALE : NONE	SHEET 1 OF 1	



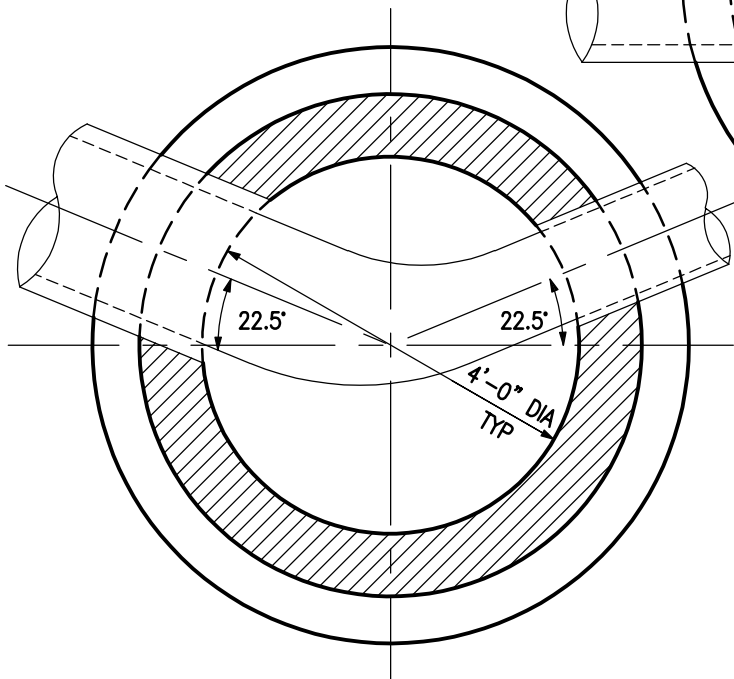
STANDARD CHANNEL NO. 8

NOTE:

BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE



STANDARD CHANNEL NO. 9



STANDARD CHANNEL NO.10



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[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

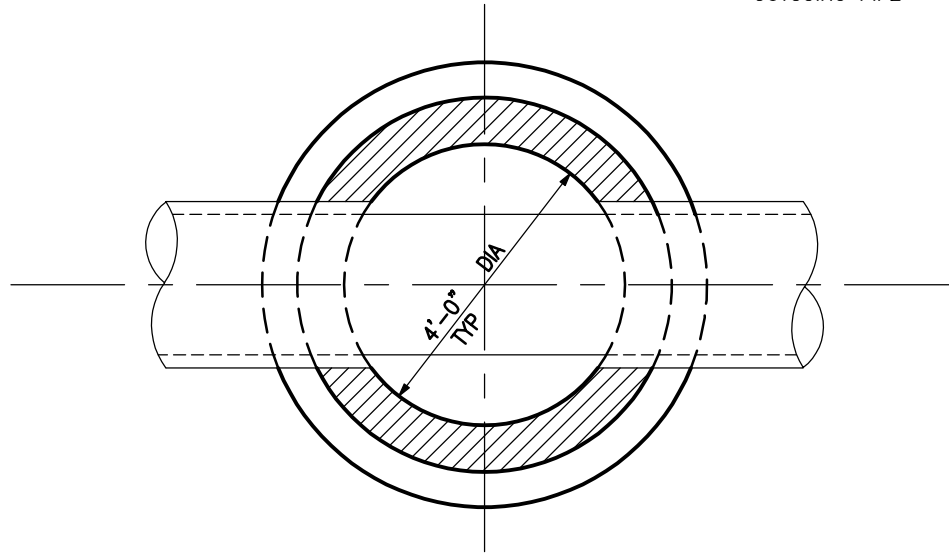
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPICAL MANHOLE CHANNELS
STANDARD CHANNEL NO. 8
STANDARD CHANNEL NO. 9
STANDARD CHANNEL NO. 10

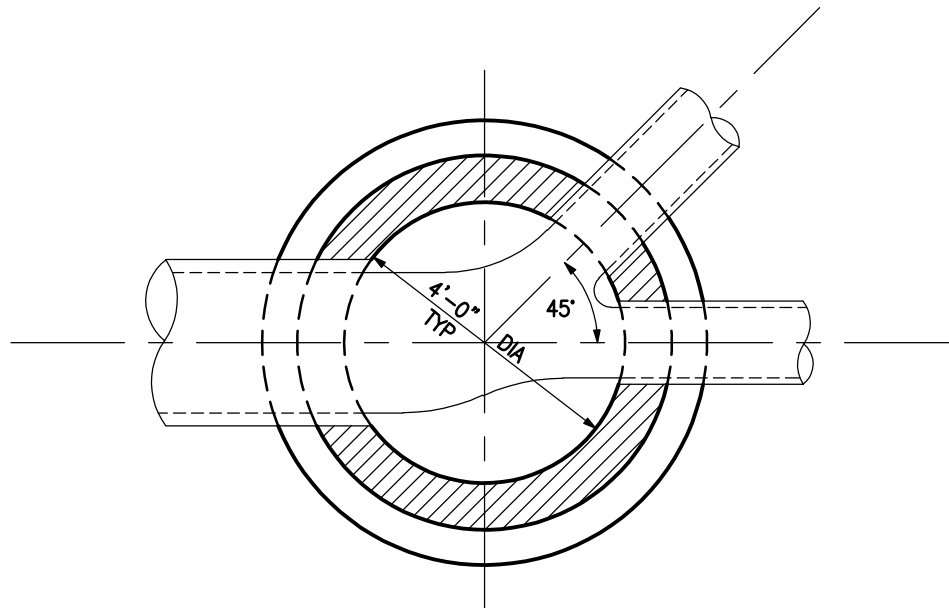
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.34		
SCALE : NONE		SHEET 1 OF 1

NOTE:


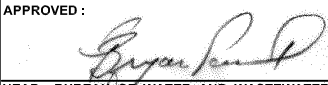

BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE

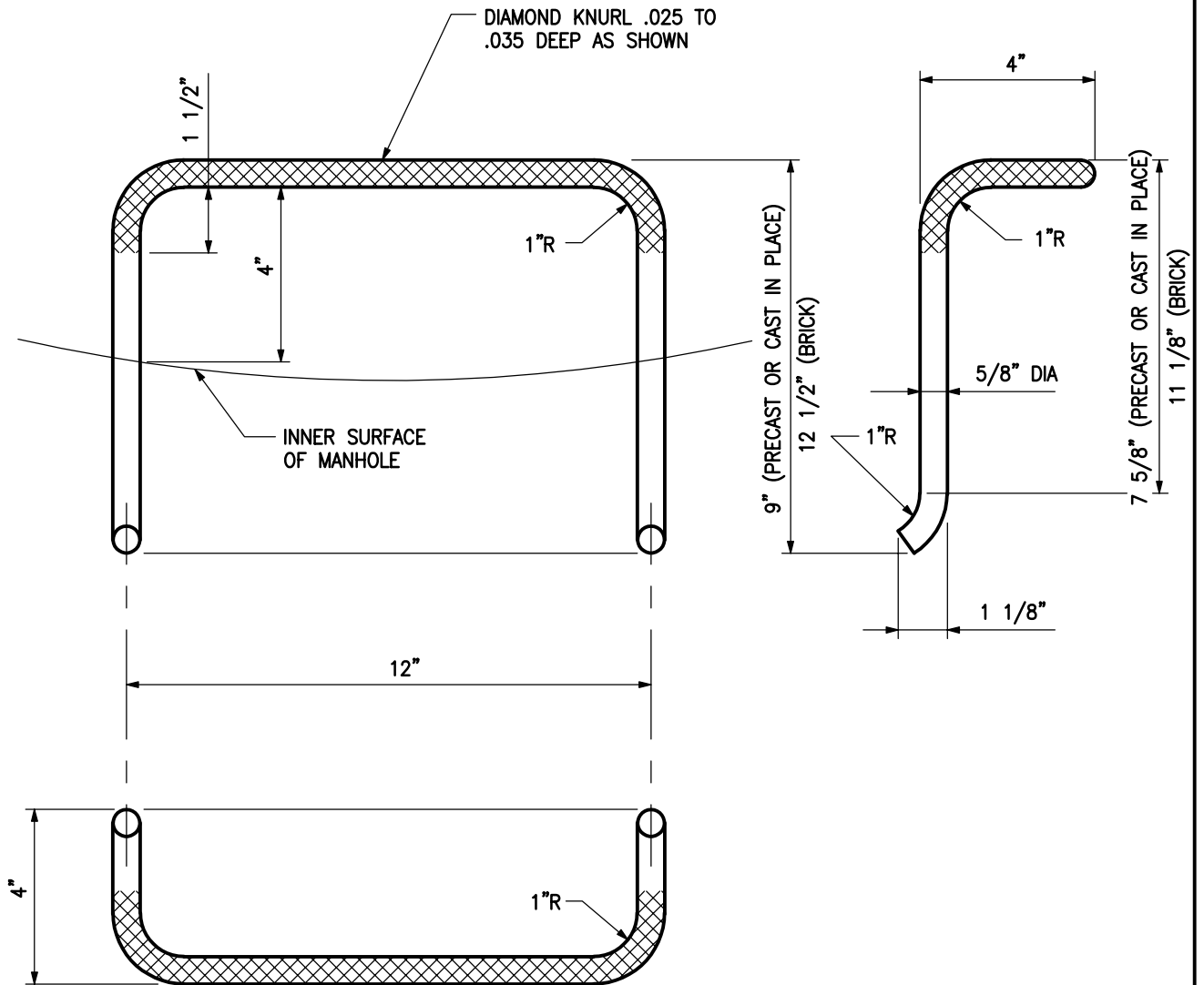


STANDARD CHANNEL NO. 11



STANDARD CHANNEL NO. 12

	APPROVED :	<p>CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER</p> <p>TYPICAL MANHOLE CHANNELS STANDARD CHANNEL NO. 11 STANDARD CHANNEL NO. 12</p>	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		<p>STANDARD NO. BC 383.35</p> <p>SCALE : NONE SHEET 1 OF 1</p>		



DROP FRONT IN-LINE OR STAGGERED

NOTES:

1. KNURL BEFORE BENDING, MIN KNURLING AS SHOWN.
2. STEPS TO BE TYPE 410 STAINLESS STEEL, MILL FINISH.



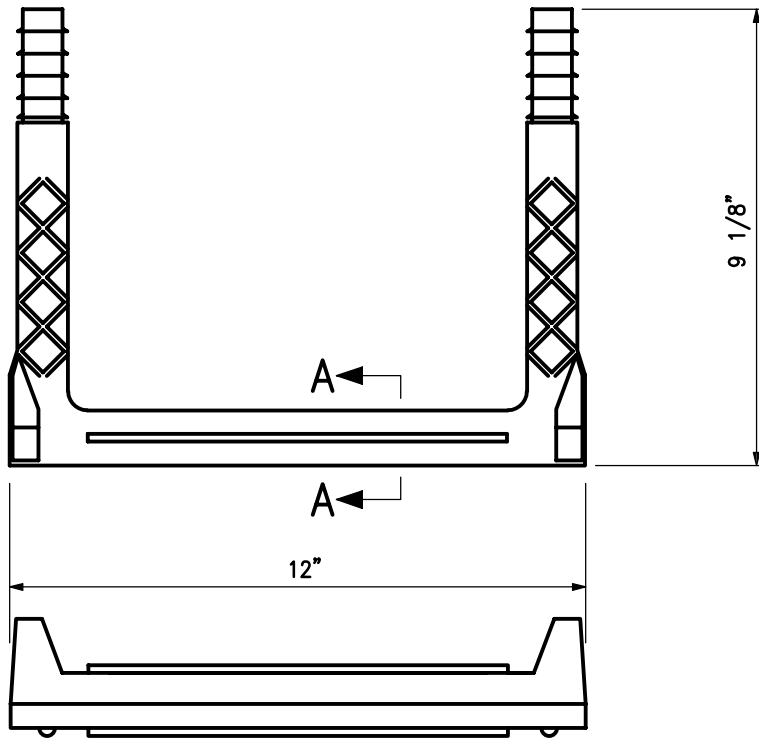
APPROVED : *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER

[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

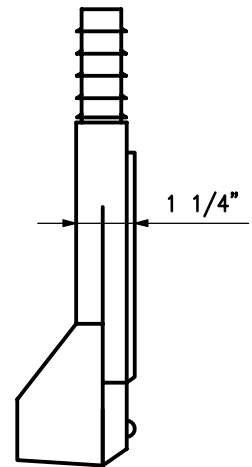
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STAINLESS STEEL
MANHOLE STEP

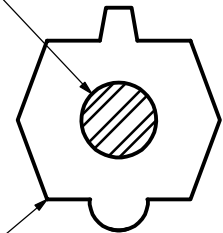
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 383.92		
SCALE : NONE		SHEET 1 OF 1



PLAN

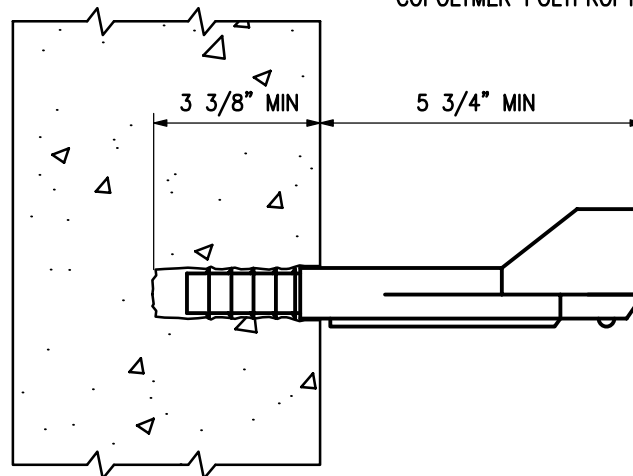


1/2" Ø GRADE 60
STEEL REINFORCEMENT



SECTION A-A

COPOLYMER POLYPROPYLENE PLASTIC



NOTE:

COPOLYMER POLYPROPYLENE SHALL BE CERTIFIED BY THE MANUFACTURER TO CONFORM TO ASTM D4101 AND HAVE A MINIMUM EXPOSED SECTION THICKNESS OF 1/8".



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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

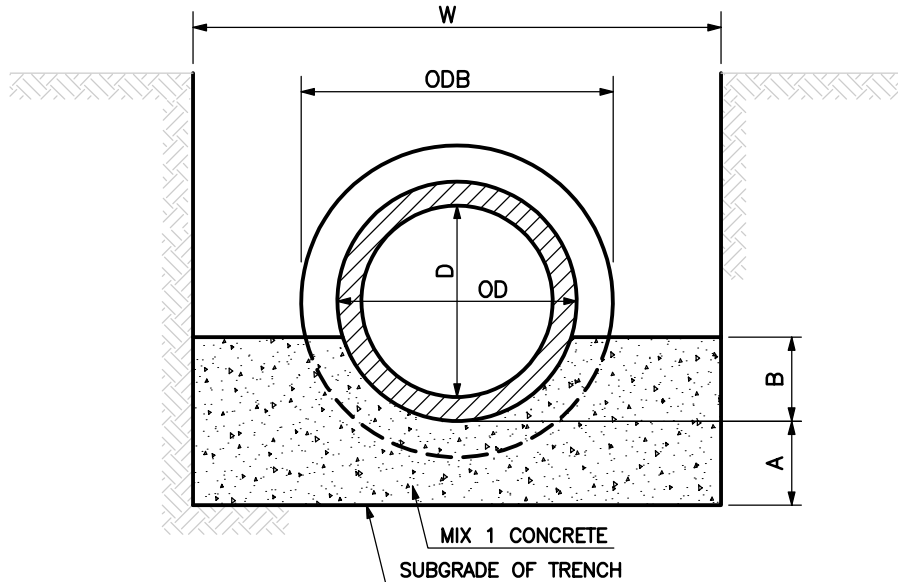
POLYPROPYLENE MANHOLE STEP
FOR PRECAST MANHOLES

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 383.93

SCALE : NONE

SHEET 1 OF 1



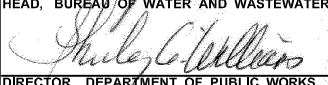


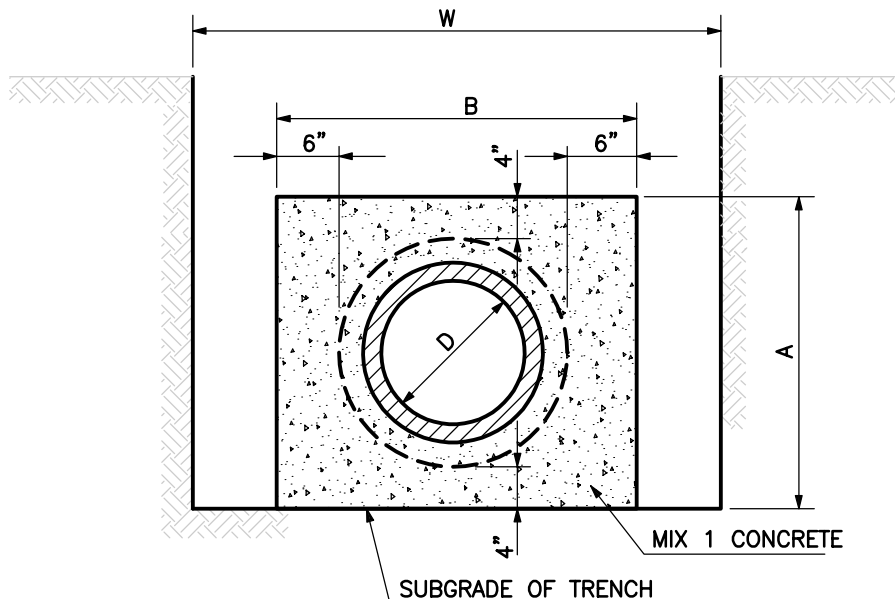
NOTE:

WHEN 2 TIER TRENCH SUPPORT IS REQUIRED,
ADD 24" TO "W" FOR CALCULATING THE AMOUNT
OF PAVING NEEDED FOR TRENCH REPAIR.

REINFORCED CONCRETE PIPE								
DIMENSIONS							CUBIC YARDS PER LIN. FT	
D	OD	ODB	A	B	W		MIN	MAX
					MIN	MAX		
15"	19"	23"	4"	5"	42"	60"	0.0817	0.1234
18"	22.5"	27"	5"	6"	42"	66"	0.0973	0.1651
21"	25.75"	30.5"	6"	7"	48"	66"	0.1310	0.1912
24"	29"	34"	6"	8"	48"	72"	0.1351	0.2215
27"	32.25"	37.5"	7"	8"	54"	78"	0.1674	0.2601
30"	36"	41.5"	8"	9"	60"	78"	0.2116	0.2904
33"	39.5"	45.5"	9"	10"	60"	84"	0.2304	0.3477
36"	42.75"	49"	9"	11"	66"	90"	0.2648	0.3883
42"	50"	57.5"	11"	13"	72"	96"	0.3407	0.4889
48"	57"	66"	12"	15"	84"	102"	0.4450	0.5700
54"	64"	72.5"	14"	16"	90"	108"	0.5336	0.6724
60"	72"	75.5"	15"	18"	102"	114"	0.6318	0.7336
66"	79"	81"	17"	20"	108"	120"	0.7588	0.8730
72"	86"	88"	18"	22"	114"	126"	0.8503	0.9738

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY


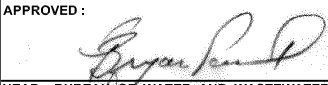

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 386.41		
			SCALE : NONE		SHEET 1 OF 1

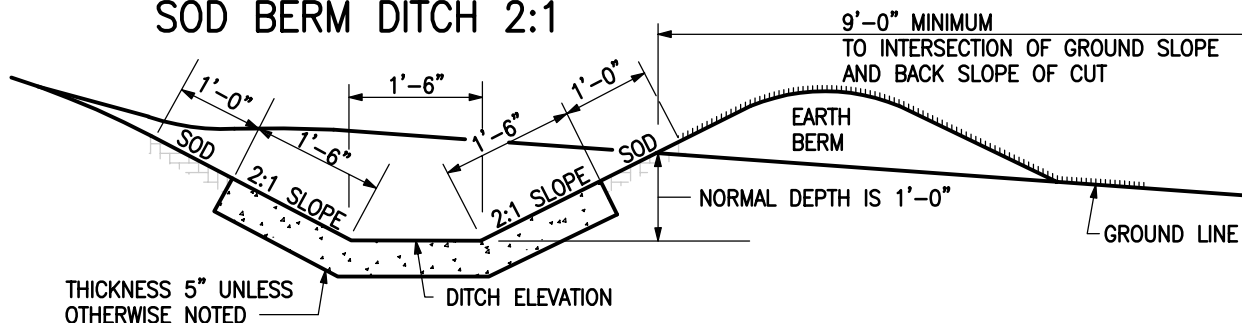
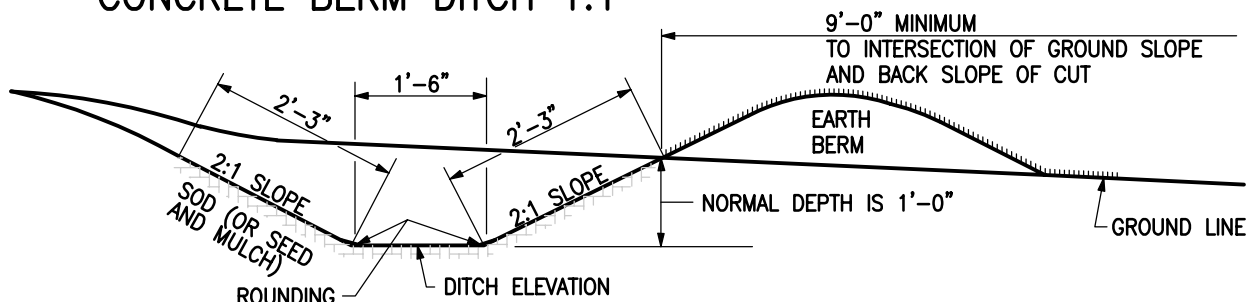
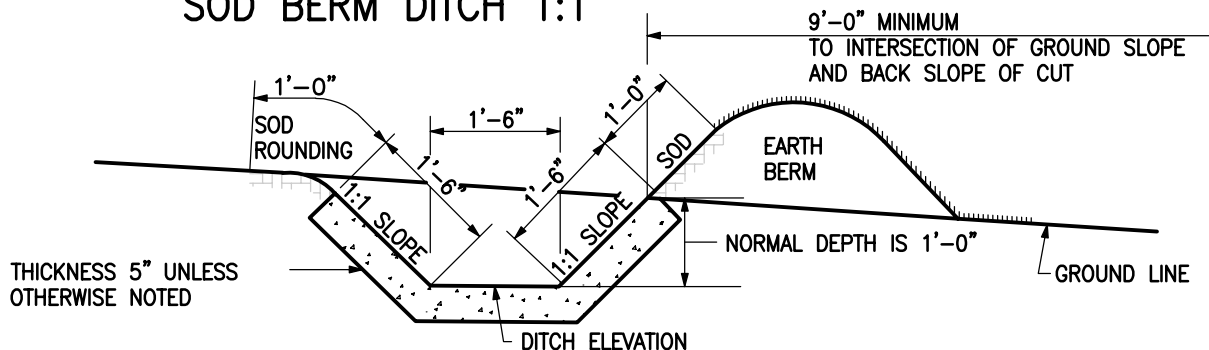
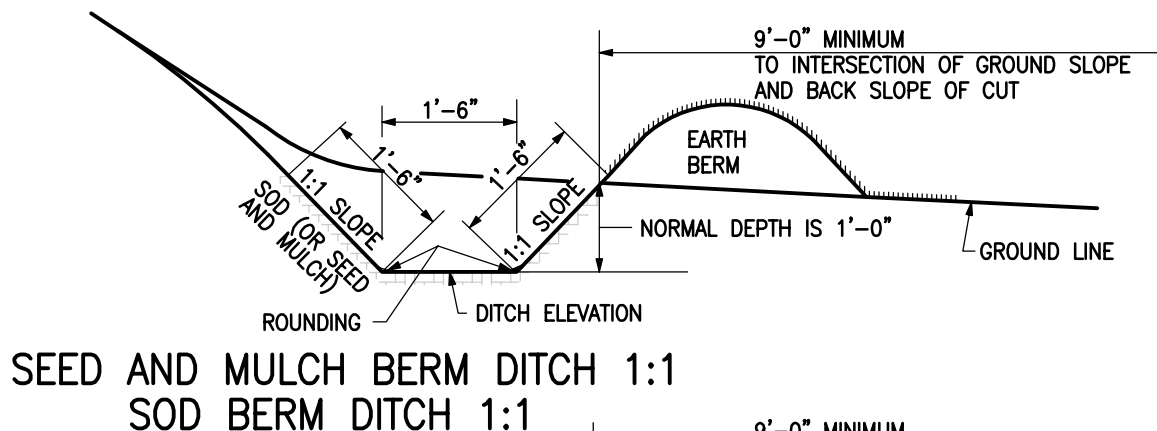


DIMENSIONS			CUBIC YARDS PER LIN. FT
D	A	B	
EXTRA STRENGTH CLAY PIPE			
6"	18"	22"	0.0894
8"	21"	25"	0.1143
10"	23.5"	27.5"	0.1348
12"	26"	30"	0.1569
15"	30"	34"	0.1912
18"	34.5"	38.5"	0.2407
21"	38"	42"	0.2701
24"	42"	46"	0.3132
27"	47"	51"	0.3890
30"	51"	55"	0.4432
REINFORCED CONCRETE PIPE			
15"	31"	35"	0.2064
18"	35"	39"	0.2487
21"	38.5"	42.5"	0.2864
24"	42"	46"	0.3261
27"	45.5"	49.5"	0.3692
30"	49.5"	53.5"	0.4204

DIMENSIONS			CUBIC YARDS PER LIN. FT
D	A	B	
PVC PIPE			
6"	15"	19"	0.0654
8"	17.5"	21.5"	0.0822
10"	20"	24"	0.1012
12"	22"	26"	0.1156
15"	24.5"	28.5"	0.1326
18"	28"	32"	0.1594
21"	31.5"	35.5"	0.1898
24"	34.5"	38.5"	0.2179
27"	38"	42"	0.2521
DUCTILE IRON PIPE			
6"	17"	21"	0.0819
8"	19.5"	23.5"	0.1006
10"	21.5"	25.5"	0.1154
12"	23.5"	27.5"	0.1294
14"	26.5"	30.5"	0.1594
16"	28.5"	32.5"	0.1764
18"	30.5"	34.5"	0.1918

NOTE: QUANTITIES IN TABLE TO BE USED FOR ESTIMATING ONLY

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 386.51		
			SCALE : NONE		SHEET 1 OF 1



NOTES:

1. DITCH ELEVATIONS AS NOTED ON PLANS.
2. 2" TOP SOIL AND SEED AND MULCH ALL CONSTRUCTION SLOPES NOT OTHERWISE TREATED.
3. WHERE DITCH LOCATION IS OTHER THAN SHOWN, DISTANCE FROM DITCH C TO A REFERENCE POINT SHALL BE INDICATED ON THE PLANS.
4. EARTH BERM TO BE CONSTRUCTED FROM DITCH EXCAVATION AND COMPACTED AS DIRECTED BY THE ENGINEER. THIS WILL NOT BE A PAY ITEM.
5. ALL SOD TO BE PLACED PER SPECIFICATION SECTION 32 92 23 SODDING.
6. CONCRETE SHALL BE MIX 6.



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

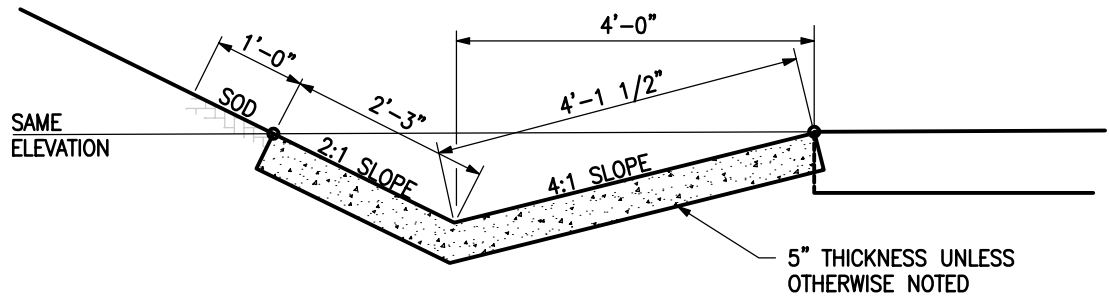
STANDARD BERM DITCHES
CONCRETE AND SOD

ISSUED	REVISED	REVISED
3 / 2008		

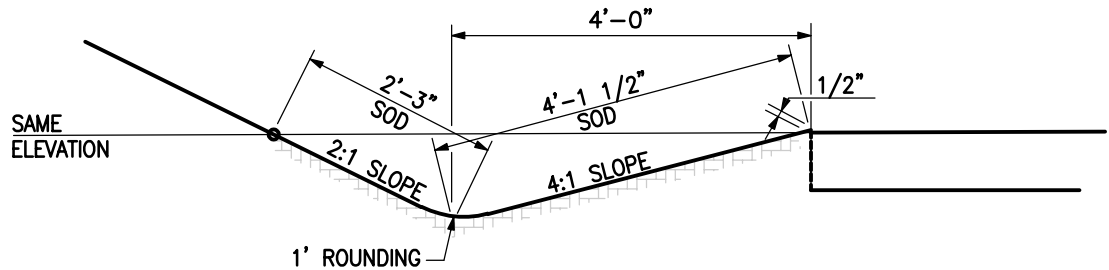
STANDARD NO.
BC 389.01

SCALE : NONE

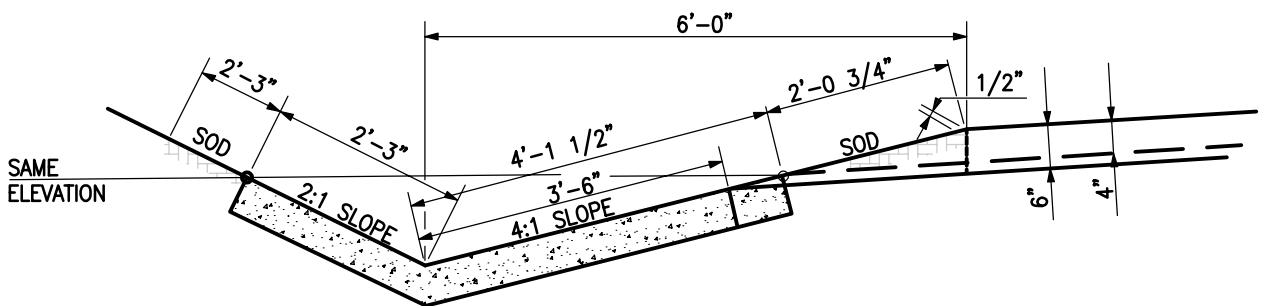
SHEET 1 OF 1



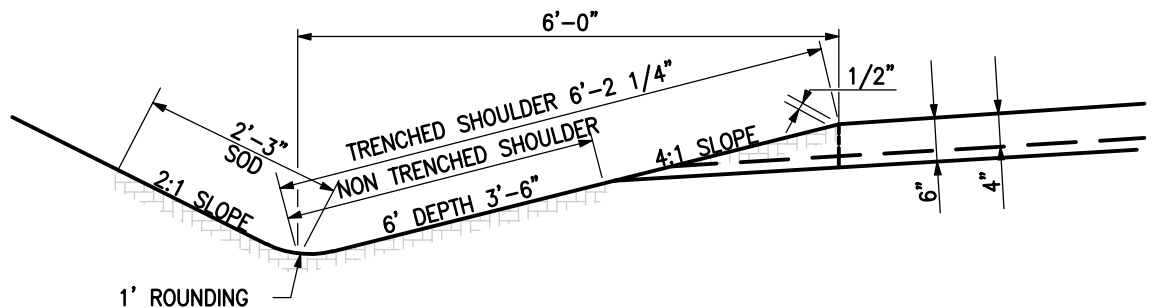
CONCRETE SURFACE DRAIN DITCH



SOD SURFACE DRAIN DITCH



CONCRETE SURFACE DRAIN DITCH



SOD SURFACE DRAIN DITCH

NOTES:

1. CONCRETE TO BE EXTENDED AS REQUIRED WHERE DEPTH OF FLOW IN DITCH EXCEEDS LIMIT OF CONCRETE AS INDICATED ABOVE.
2. OMIT SOD STRIP ON SHOULDER SIDE OF DITCH OF NON-TRENCHED SHOULDERS.
3. ALL SOD TO BE PLACED PER SPECIFICATION SECTION 32 92 23 SODDING.
4. CONCRETE SHALL BE MIX 2.



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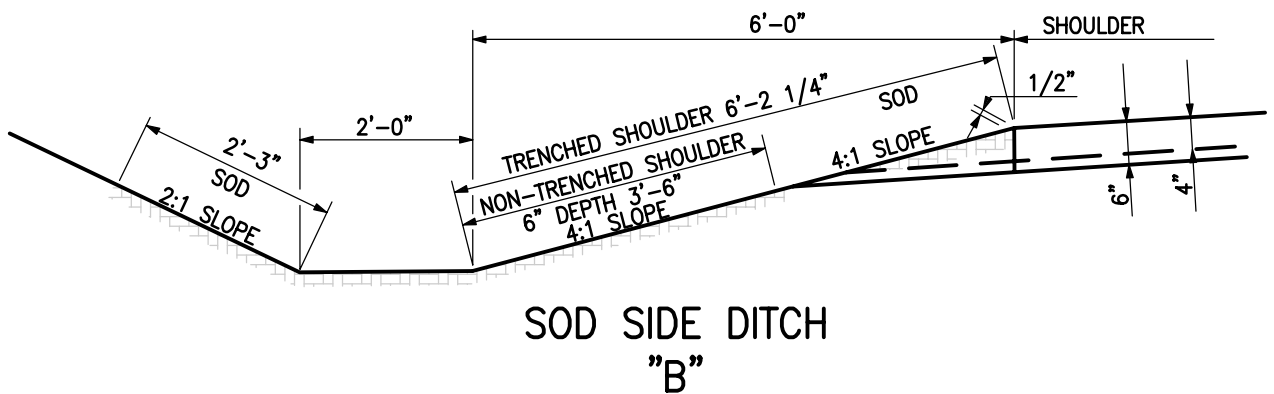
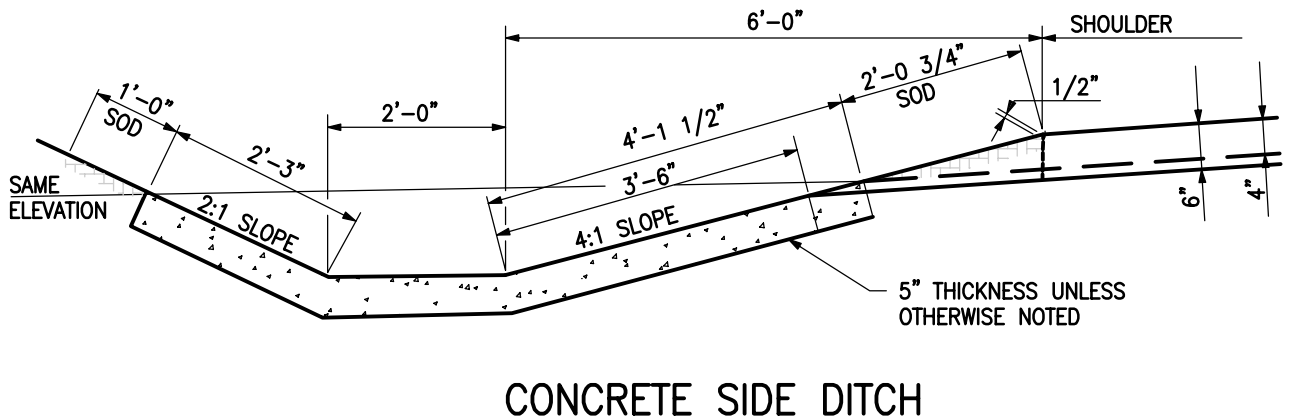
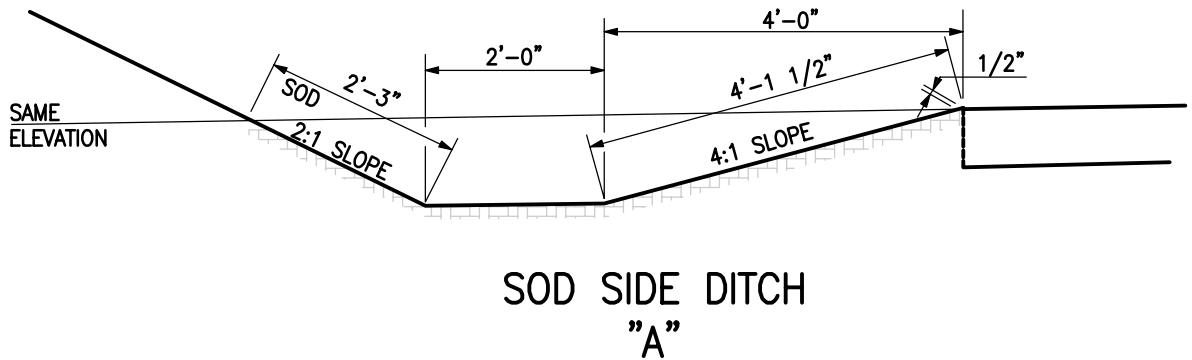
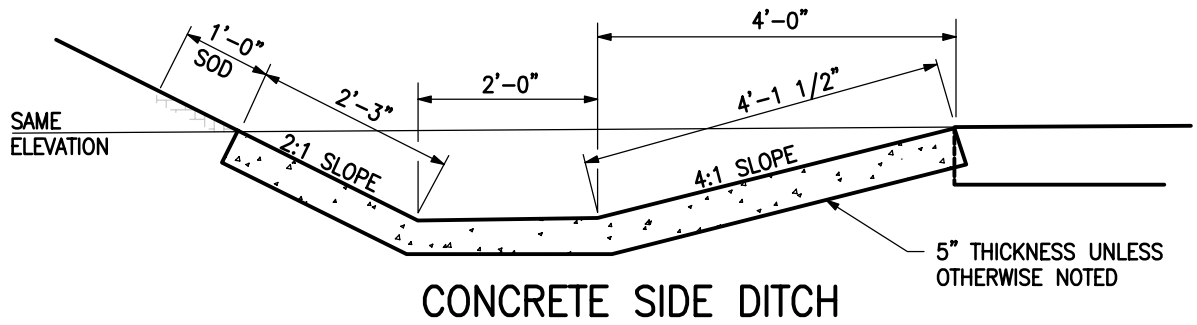
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 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD SIZE
 DITCHES-V SLOPE

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 389.02		
SCALE : NONE		SHEET 1 OF 1



NOTES:

1. WHEN DITCHES ARE CONSTRUCTED OTHER THAN AS SHOWN, THE ELEVATIONS WILL BE NOTED ON THE PLANS.
2. ALL SOD TO BE PLACED PER SPECIFICATION SECTION 32 92 23 SODDING.
3. CONCRETE SHALL BE MIX 2.



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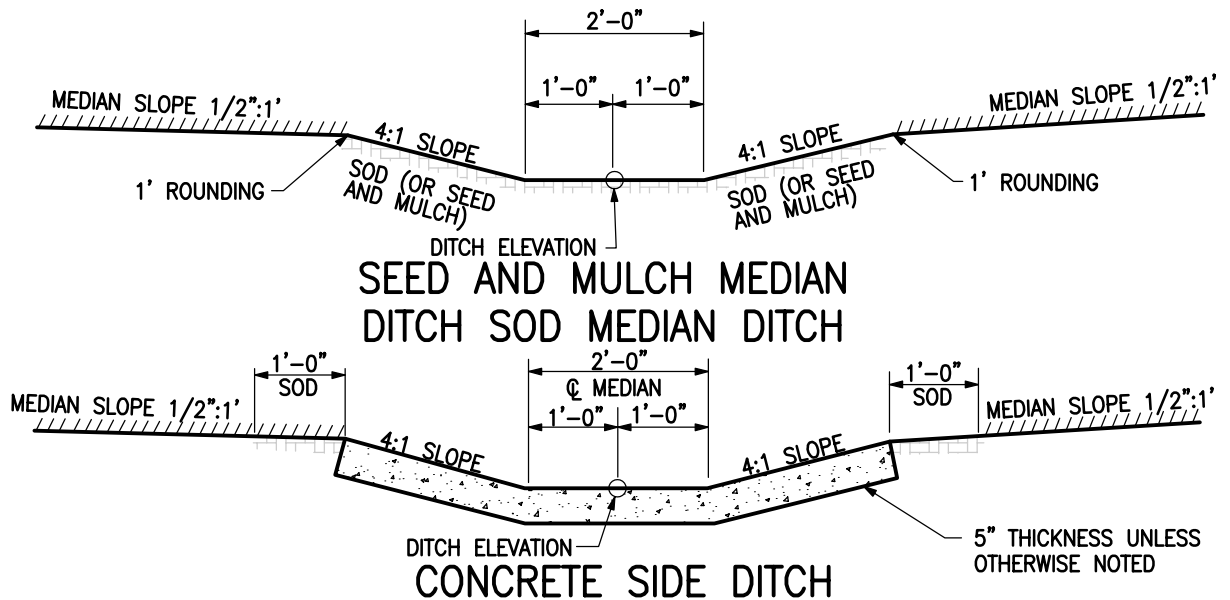
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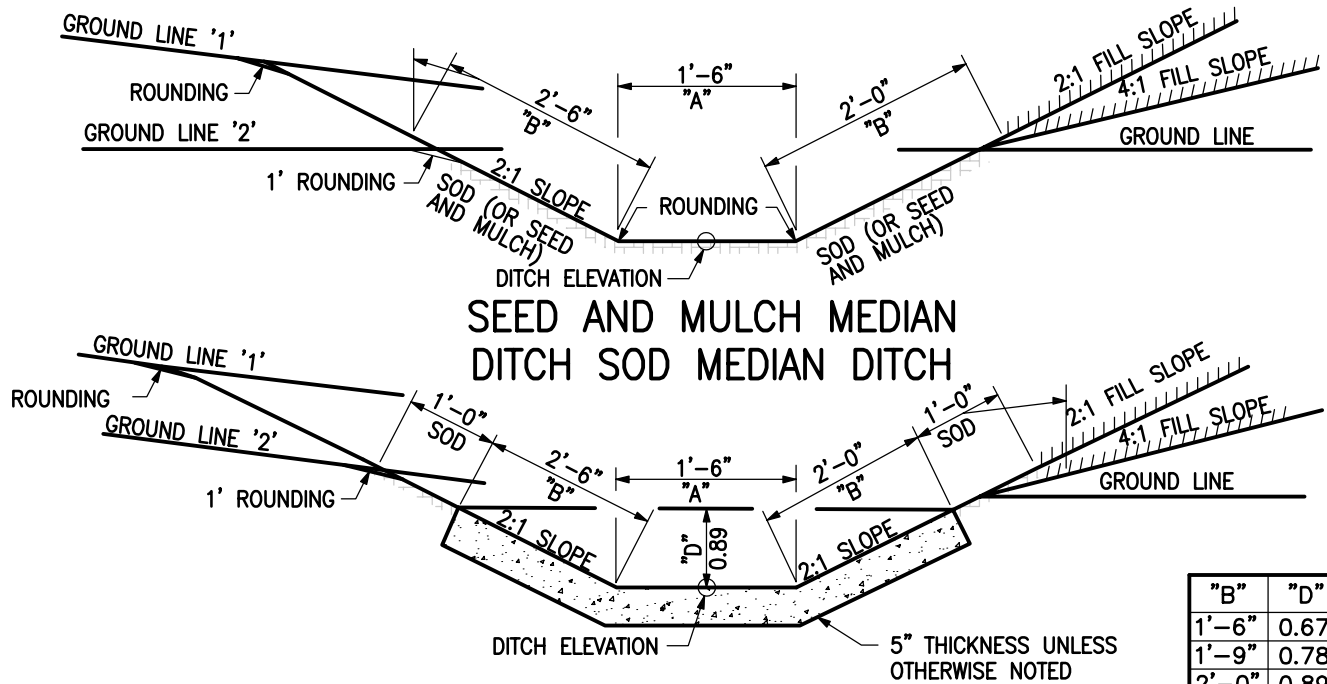
STANDARD SIDE DITCHES
 TRAPEZOIDAL

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 389.03		
SCALE : NONE		SHEET 1 OF 1



NOTES:

1. DITCH DEPTHS OTHER THAN 6" TO BE NOTED BY ELEVATIONS ON PLANS.
2. DIMENSION "B" MAY BE MODIFIED BY NOTE ON PLANS.
3. 4" TOP SOIL AND SEED AND MULCH ALL CONSTRUCTION SLOPES NOT OTHERWISE TREATED.
4. WHERE DITCH IS OTHER THAN 6" DEPTH, THE 4:1 SLOPE RATIO SHALL BE MAINTAINED, EXCEPT TRANSITIONS TO INLETS OF DRAINAGE STRUCTURES.
5. WHERE ϕ DITCH IS NOT AT ϕ MEDIAN, OFFSET DISTANCES SHALL BE INDICATED ON PLANS.
6. CONCRETE SHALL BE MIX 2.



NOTES:

1. ELEVATIONS AS NOTED ON PLANS.
2. DIMENSIONS "A" AND "B" MAY BE MODIFIED BY NOTE ON PLANS.
3. 2" TOP SOIL AND SEED AND MULCH ALL CONSTRUCTION SLOPES NOT OTHERWISE TREATED.
4. WHERE DITCH IS NOT ADJACENT TO TOE OF FILL, DISTANCES FROM ϕ DITCH TO A REFERENCE POINT SHALL BE INDICATED ON THE PLANS.
5. ALL SOD TO BE PLACED PER SPECIFICATION SECTION 32 92 23 SODDING.
6. CONCRETE SHALL BE MIX 2.

"B"	"D"
1'-6"	0.67'
1'-9"	0.78'
2'-0"	0.89'
2'-3"	1.01'
2'-6"	1.12'
2'-9"	1.23'
3'-0"	1.34'
3'-3"	1.45'
3'-6"	1.57'
3'-9"	1.68'
4'-0"	1.79'



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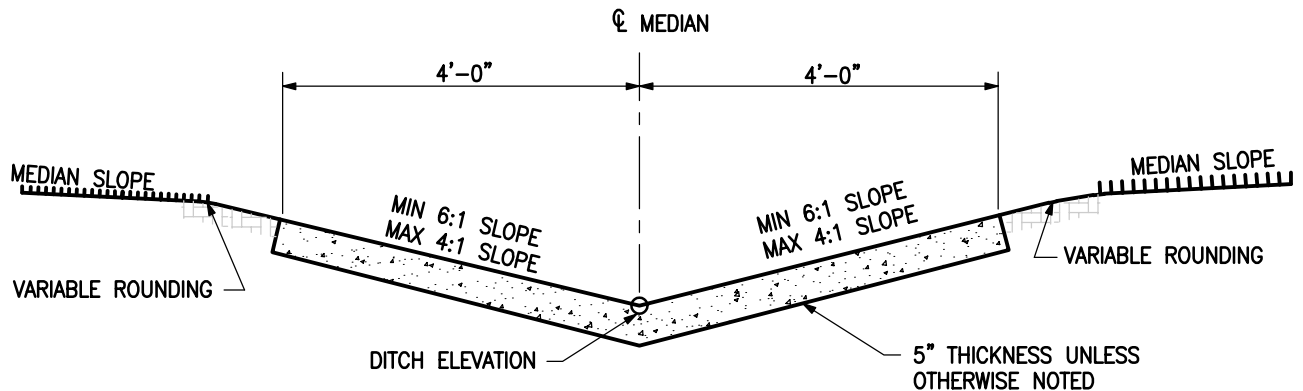
CITY OF BALTIMORE
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STANDARD MEDIAN DITCHES
 TRAPEZOIDAL

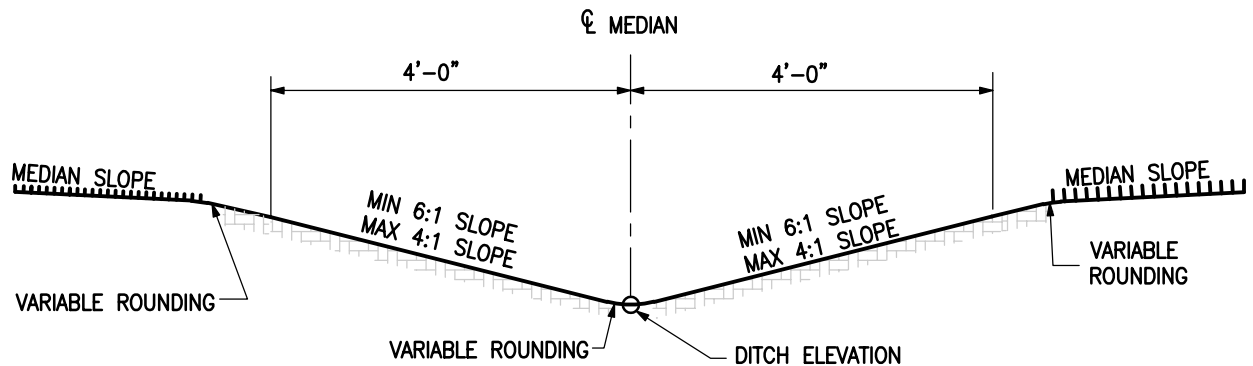
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 389.04

SCALE: NONE SHEET 1 OF 1



CONCRETE MEDIAN 'V' DITCH



SOD MEDIAN 'V' DITCH

NOTES:

1. ELEVATIONS AS NOTED ON PLANS.
2. 2" TOP SOIL AND SEED AND MULCH ALL CONSTRUCTION SLOPES NOT OTHERWISE TREATED.
3. WHERE DITCH IS NOT ADJACENT TO TOE OF FILL, DISTANCES FROM CL DITCH TO A REFERENCE POINT SHALL BE INDICATED ON THE PLANS.
4. ALL SOD TO BE PLACED PER SPECIFICATION SECTION 32 92 23 SODDING.
5. CONCRETE SHALL BE MIX 2.



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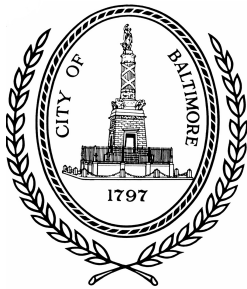
STANDARD MEDIAN
DITCHES-V SLOPE

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 389.05

SCALE : NONE

SHEET 1 OF 1



Standard Wastewater Details

March 2008

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
WASTEWATER INDEX OF DRAWINGS**

WASTEWATER DETAILS:

Dwg. No.	Description	Pages
BC 830.01	Gravel Cradle for E.S.C.P. Sanitary Sewers	1 of 1
BC 830.02	Gravel Cradle for R.C.P. Sanitary Sewers	1 of 1
BC 830.03	Gravel Cradle for P.V.C. Sanitary Sewers	1 of 1
BC 830.04	Concrete Encasement for Sanitary Sewers	1 of 1
BC 830.05	Standard Brick and Concrete Curves for Sanitary Sewers	1 of 1
BC 830.06	Concrete Cradle for Sanitary Sewers	1 of 1
BC 830.13	Typical Plugging Detail Sanitary House Connection	1 of 1
BC 830.14	Typical Installations of Sanitary House Connections	1 of 1
BC 830.15	Typical House Connection with Cleanout in Public Right of Way	1 of 1
BC 830.16	Typical Installations of Standpipe House Connections	1 of 1
BC 830.17	Saddle Installation Detail for New House Connection to Existing Sewer	1 of 1
BC 830.18	Pipe Replacement Detail for New House Connections to Existing Sewers	1 of 1
BC 830.19	Measuring and Recording As Built Location of New Sanitary House Connection:	1 of 2
BC 830.19	Measuring and Recording As Built Location of New Sanitary House Connection:	2 of 2
BC 830.20	Typical Detail for Leakage Exfiltration Testing	1 of 1
BC 831.01	Standard Brick Sanitary Manhole	1 of 1
BC 831.02	Sanitary Manhole Type C	1 of 1
BC 831.03	Sanitary Terminal Manhole	1 of 1
BC 831.04	48" Diameter Precast Sanitary Manhole for Pipe Diameters up to 24"	1 of 1
BC 831.05	60" Diameter Precast Sanitary Manhole for Pipe Diameters up to 36"	1 of 1
BC 831.06	72" Diameter Precast Sanitary Manhole for Pipe Diameters up to 48"	1 of 1
BC 831.07	48" Diameter Precast "Doghouse" Riser for Pipe Diameters up to 24"	1 of 1
BC 831.08	60" Diameter Precast "Doghouse" Riser for Pipe Diameters up to 36"	1 of 1
BC 831.09	Sanitary Type A Drop Connection/Sanitary Type B Drop Connection	1 of 1
BC 831.10	Manhole Abandonment	1 of 1
BC 831.20	Sanitary Offset Manhole 30" Cover	1 of 1
BC 831.21	Standard Sanitary Manhole Precast Slab	1 of 1
BC 831.22	Precast Manhole Slab for 24" Frame	1 of 1
BC 831.23	Special Fittings	1 of 1
BC 831.24	Standard San. 24" Manhole Cover	1 of 1
BC 831.25	Standard 24" Manhole Frame	1 of 1
BC 831.26	Standard Sanitary 30" Manhole Cover	1 of 1
BC 831.27	Standard 30" Manhole Frame	1 of 1
BC 831.28	Locking Device for Manhole Frame & Cover	1 of 1
BC 831.29	Cleanout Cover Assembly	1 of 1

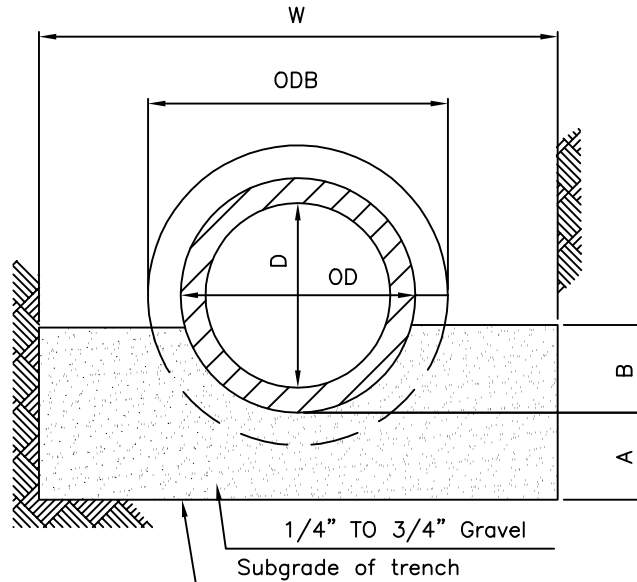
BC 831.30	Type 1 Step for Brick Manholes	1 of 1
BC 831.31	Type 2 Step for Precast & Cast in Place Manholes	1 of 1
BC 831.32	Copolymer Polypropylene Steps for Precast and Cast in Place Manholes	1 of 1
BC 831.35	Typical Manhole Channels Standard Channel No.1 and No.2	1 of 1
BC 831.36	Typical Manhole Channels Standard Channel No.3, No.4 and No.5	1 of 1
BC 831.37	Typical Manhole Channels Standard Channel No.6 and No.7	1 of 1
BC 831.38	Typical Manhole Channels Standard Channel No.8, No.9 and No. 10	1 of 1
BC 831.39	Typical Manhole Channels Standard Channel No. 11 and No. 12	1 of 1

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
WASTEWATER CROSS INDEX OF DRAWINGS**

WASTEWATER DETAILS:

Old Dwg. No.	Dwg. No.	Description	Pages
BC 830.01 1 OF 3	BC 830.01	Gravel Cradle for E.S.C.P. Sanitary Sewers	1 of 1
BC 830.01 2 OF 3	BC 830.02	Gravel Cradle for R.C.P. Sanitary Sewers	1 of 1
BC 830.01 3 OF 3	BC 830.03	Gravel Cradle for P.V.C. Sanitary Sewers	1 of 1
BC 830.02	BC 830.04	Concrete Encasement for Sanitary Sewers	1 of 1
BC 830.03	BC 830.05	Standard Brick and Concrete Curves for Sanitary Sewers	1 of 1
BC 830.04	BC 830.06	Concrete Cradle for Sanitary Sewers	1 of 1
BC 830.13	BC 830.13	Typical Plugging Detail Sanitary House Connection	1 of 1
BC 830.10	BC 830.14	Typical Installations of Sanitary House Connections	1 of 1
BC 830.11	BC 830.15	Typical House Connection with Cleanout in Public Right of Way	1 of 1
BC 830.12	BC 830.16	Typical Installations of Standpipe House Connections	1 of 1
	BC 830.17	Saddle Installation Detail for New House Connection to Existing Sewer	1 of 1
	BC 830.18	Pipe Replacement Detail for New House Connections to Existing Sewers	1 of 1
	BC 830.19	Measuring and Recording As Built Location of New Sanitary House Connections	1 of 2
	BC 830.19	Measuring and Recording As Built Location of New Sanitary House Connections	2 of 2
	BC 830.20	Typical Detail for Leakage Exfiltration Testing	1 of 1
BC 870.01	BC 831.01	Standard Brick Sanitary Manhole	1 of 1
BC 870.02	BC 831.02	Sanitary Manhole Type C	1 of 1
BC 870.03	BC 831.03	Sanitary Terminal Manhole	1 of 1
BC 870.35	BC 831.04	48" Diameter Precast Sanitary Manhole for Pipe Diameters up to 24"	1 of 1
BC 870.36	BC 831.05	60" Diameter Precast Sanitary Manhole for Pipe Diameters up to 36"	1 of 1
BC 870.37	BC 831.06	72" Diameter Precast Sanitary Manhole for Pipe Diameters up to 48"	1 of 1
BC 870.39	BC 831.07	48" Diameter Precast "Doghouse" Riser for Pipe Diameters up to 24"	1 of 1


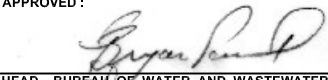
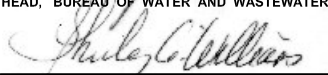
	BC 831.08	60" Diameter Precast "Doghouse" Riser for Pipe Diameters up to 36"	1 of 1
BC 870.04	BC 831.09	Sanitary Type A Drop Connection/Sanitary Type B Drop Connection	1 of 1
	BC 831.10	Manhole Abandonment	1 of 1
BC 870.05	BC 831.20	Sanitary Offset Manhole 30" Cover	1 of 1
BC 870.06	BC 831.21	Standard Sanitary Manhole Precast Slab	1 of 1
BC 870.07	BC 831.22	Precast Manhole Slab for 24" Frame	1 of 1
BC 870.08	BC 831.23	Special Fittings	1 of 1
BC 870.11	BC 831.24	Standard San. 24" Manhole Cover	1 of 1
BC 870.12	BC 831.25	Standard 24" Manhole Frame	1 of 1
BC 870.13	BC 831.26	Standard Sanitary 30" Manhole Cover	1 of 1
BC 870.14	BC 831.27	Standard 30" Manhole Frame	1 of 1
BC 870.15	BC 831.28	Locking Device for Manhole Frame & Cover	1 of 1
	BC 831.29	Cleanout Cover Assembly	1 of 1
BC 870.16	BC 831.30	Type 1 Step for Brick Manholes	1 of 1
BC 870.17	BC 831.31	Type 2 Step for Precast & Cast in Place Manholes	1 of 1
	BC 831.32	Copolymer Polypropylene Steps for Precast and Cast in Place Manholes	1 of 1
BC 870.30	BC 831.35	Typical Manhole Channels Standard Channel No.1 and No.2	1 of 1
BC 870.31	BC 831.36	Typical Manhole Channels Standard Channel No.3, No.4 and No.5	1 of 1
BC 870.32	BC 831.37	Typical Manhole Channels Standard Channel No.6 and No.7	1 of 1
BC 870.33	BC 831.38	Typical Manhole Channels Standard Channel No.8, No.9 and No. 10	1 of 1
BC 870.34	BC 831.39	Typical Manhole Channels Standard Channel No. 11 and No. 12	1 of 1

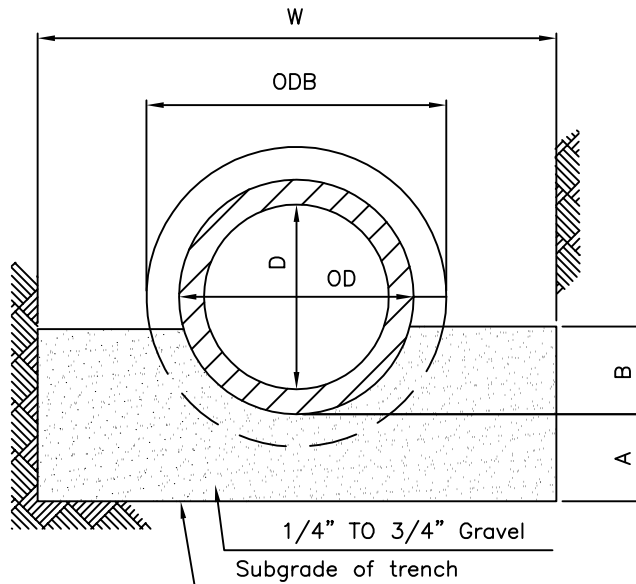


NOTES:

1. Stone (No. 6 Aggregate) may be substituted for gravel.
2. The trench widths "W" shown in the table below shall be used when constructing sanitary sewers using Ductile Iron Pipe.
3. When 2 tier trench support is required, add 24" to "W" for calculating the amount of paving needed for trench repair.

EXTRA STRENGTH CLAY PIPE								
DIMENSIONS							CUBIC YARDS PER LIN. FT.	
D	OD	ODB	A	B	W		MIN.	MAX.
					MIN.	MAX.		
6"	7.75"	10"	5"	4"	30"	60"	0.0631	0.1325
8"	10.25"	13"	6"	5"	30"	60"	0.0745	0.1594
10"	12.5"	15.5"	6"	6"	30"	60"	0.0776	0.1702
12"	14.75"	18"	6"	6"	36"	60"	0.0941	0.1682
15"	18.75"	22"	6"	6"	42"	60"	0.1100	0.1656
18"	22.5"	26.5"	6"	6"	42"	66"	0.1074	0.1814
21"	26.5"	30"	6"	6"	48"	66"	0.1235	0.1790
24"	30"	34"	6"	6"	48"	72"	0.1223	0.1963
27"	33.75"	39"	7"	6"	54"	78"	0.1524	0.2326
30"	37.25"	43"	7"	6"	60"	78"	0.1717	0.2319

	APPROVED : 	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED 3 / 2008	REVISED 	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER 	GRAVEL CRADLE FOR E.S.C.P. SANITARY SEWERS	STANDARD NO. BC 830.01		
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS	SCALE : NONE		SHEET 1 OF 1	



NOTES:

1. Stone (No. 6 Aggregate) may be substituted for gravel.
2. When 2 tier trench support is required, add 24" to "W" for calculating the amount of paving needed for trench repair.

REINFORCED CONCRETE PIPE								
DIMENSIONS							CUBIC YARDS PER LIN. FT.	
D	OD	ODB	A	B	W		MIN.	MAX.
					MIN.	MAX.		
15"	19"	23"	7"	6"	42"	60"	0.1203	0.1805
18"	22.5"	27"	7"	6"	42"	66"	0.1182	0.1984
21"	25.75"	30.5"	7"	6"	48"	66"	0.1372	0.1974
24"	29"	34"	7"	6"	48"	72"	0.1346	0.2148
27"	32.25"	37.5"	7"	6"	54"	78"	0.1528	0.2330
30"	36"	41.5"	7"	6"	60"	78"	0.1711	0.2313
33"	39.5"	45.5"	7"	6"	60"	84"	0.1710	0.2512
36"	42.75"	49"	8"	6"	66"	90"	0.2063	0.2927
42"	50"	57.5"	8"	6"	72"	96"	0.2249	0.3113
48"	57"	66"	9"	6"	84"	102"	0.2848	0.3542
54"	64"	72.5"	9"	7"	90"	108"	0.3209	0.3949
60"	72"	75.5"	6"	8"	102"	114"	0.3046	0.3478
66"	79"	81"	6"	8"	108"	120"	0.3232	0.3664
72"	86"	88"	6"	9"	114"	126"	0.3620	0.4083



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

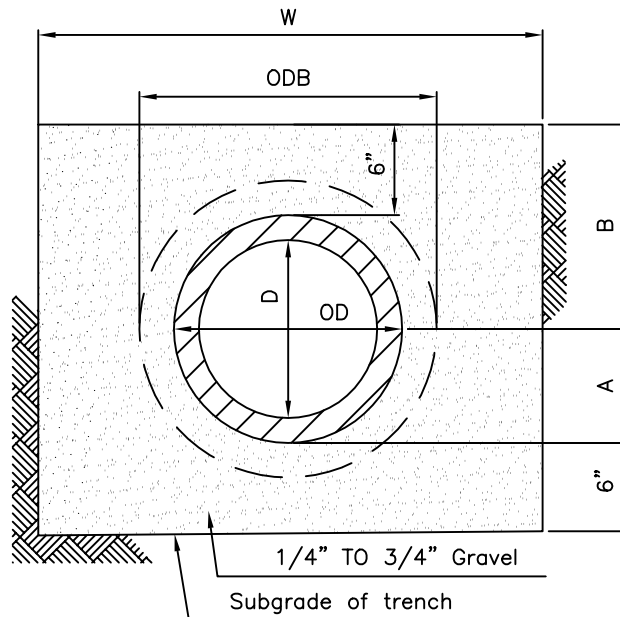
**CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER**

**GRAVEL CRADLE FOR
 R.C.P. SANITARY SEWERS**

ISSUED	REVISED	REVISED
3 / 2008		

**STANDARD NO.
 BC 830.02**

SCALE : NONE	SHEET 1 OF 1
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NOTES:

1. Stone (No. 6 Aggregate) may be substituted for gravel.
2. When 2 tier trench support is required, add 24" to "W" for calculating the amount of paving needed for trench repair
3. Haunching area (A) around the pipe shall be compacted to a minimum 95% proctor density. Tamping shall be done in 4" layers to the spring line. Compaction of the embedment material should be done in a way that the compaction equipment will not damage the pipe or cause deflection of/in the pipe. When Hydro-Hammers are used to achieve compaction they should not be used within 3' of the top of pipe and then only if the embedment material density has been previously compacted to a minimum 85% proctor density.

P.V.C. PIPE								
DIMENSIONS							CUBIC YARDS PER LIN. FT.	
D	OD	ODB	A	B	W		MIN.	MAX.
					MIN.	MAX.		
6"	6.25"	7"	3.13"	9.13"	30"	60"	0.1330	0.2737
8"	8.5"	9.5"	4.25"	10.25"	30"	60"	0.1436	0.3018
10"	10.5"	12"	5.25"	11.25"	30"	60"	0.1513	0.3250
12"	12.5"	14"	6.25"	12.25"	36"	60"	0.1953	0.3465
15"	15.25"	16.5"	7.63"	13.63"	42"	60"	0.2474	0.3735
18"	18.75"	20"	9.38"	15.38"	42"	66"	0.2612	0.4510
21"	22"	23.5"	11"	17"	48"	66"	0.3220	0.4794
24"	24.75"	26.5"	12.38"	18.38"	48"	72"	0.3300	0.5568
27"	28"	30"	14"	20"	54"	78"	0.3972	0.6441



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 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

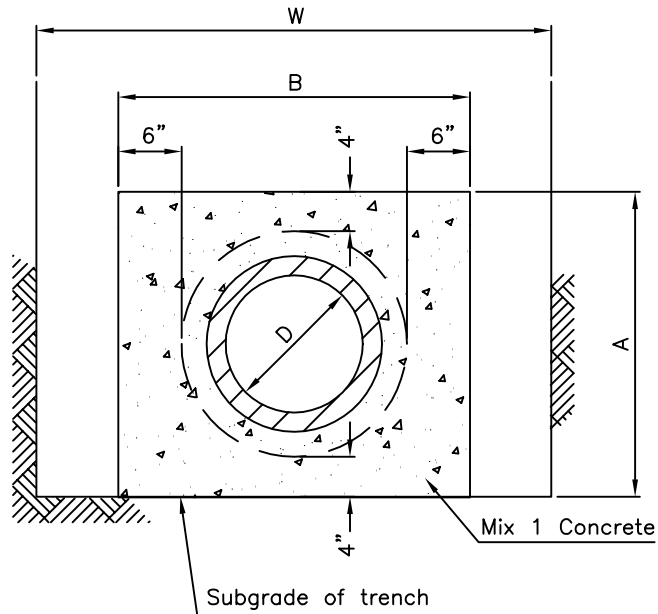
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

GRAVEL CRADLE FOR
 P.V.C. SANITARY SEWERS

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 830.03

SCALE : NONE	SHEET 1 OF 1
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DIMENSIONS			C.Y. PER L.F.
D	A	B	
EXTRA STRENGTH CLAY PIPE			
6"	18"	22"	0.0894
8"	21"	25"	0.1143
10"	23.5"	27.5"	0.1348
12"	26"	30"	0.1569
15"	30"	34"	0.1912
18"	34.5"	38.5"	0.2407
21"	38"	42"	0.2701
24"	42"	46"	0.3132
27"	47"	51"	0.3890
30"	51"	55"	0.4432
REINFORCED CONCRETE PIPE			
15"	31"	35"	0.2064
18"	35"	39"	0.2487
21"	38.5"	42.5"	0.2864
24"	42"	46"	0.3261
27"	45.5"	49.5"	0.3692
30"	49.5"	53.5"	0.4204

DIMENSIONS			C.Y. PER L.F.
D	A	B	
P.V.C. PIPE			
6"	15"	19"	0.0654
8"	17.5"	21.5"	0.0822
10"	20"	24"	0.1012
12"	22"	26"	0.1156
15"	24.5"	28.5"	0.1326
18"	28"	32"	0.1594
21"	31.5"	35.5"	0.1898
24"	34.5"	38.5"	0.2179
27"	38"	42"	0.2521
DUCTILE IRON PIPE			
6"	17"	21"	0.0819
8"	19.5"	23.5"	0.1006
10"	21.5"	25.5"	0.1154
12"	23.5"	27.5"	0.1294
14"	26.5"	30.5"	0.1594
16"	28.5"	32.5"	0.1764
18"	30.5"	34.5"	0.1918



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

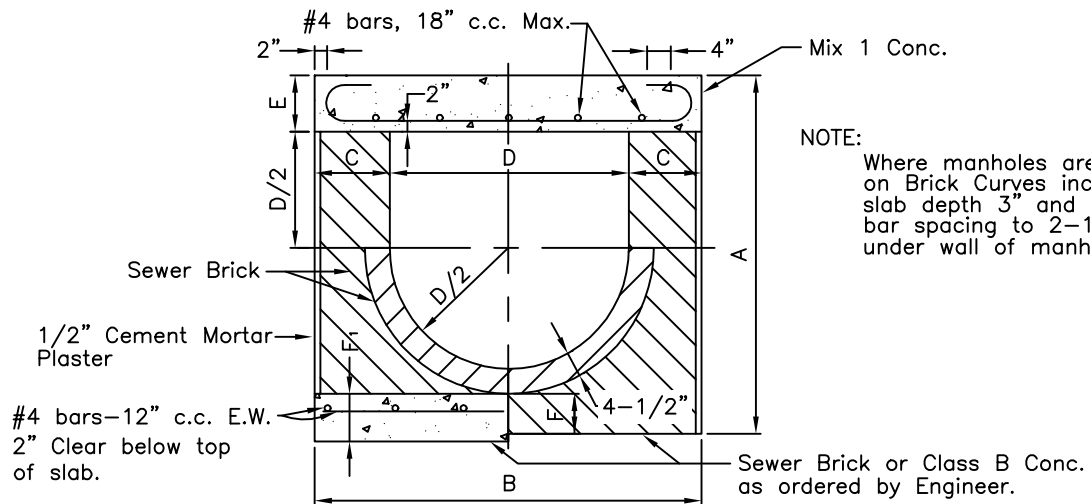
CONCRETE ENCASEMENT
 FOR SANITARY SEWERS

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 830.04


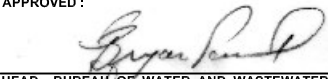
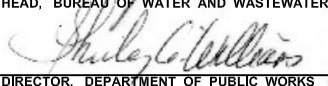
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SHEET 1 OF 1

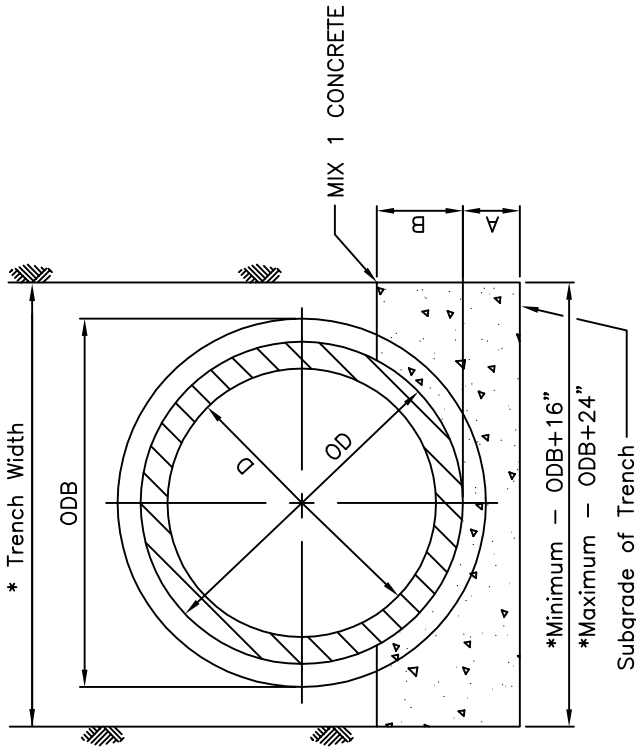


DIMENSIONS								
D	A	B	C	E	F	F ₁	STEEL	No. of Temp. bar
24"	3'-5"	3'-6"	9"	8"	4-1/2"	6"	#5 bars @ 10" c.c.	3
27"	3'-8"	3'-9"	9"	8"	4-1/2"	6"	#5 bars @ 8" c.c.	3
30"	3'-11"	4'-0"	9"	8"	4-1/2"	6"	#5 bars @ 7" c.c.	3
33"	4'-2"	4'-3"	9"	8"	4-1/2"	6"	#5 bars @ 6" c.c.	3
36"	4'-5"	4'-6"	9"	8"	4-1/2"	6"	#5 bars @ 5" c.c.	3
42"	5'-3"	5'-8"	13"	10"	6-1/2"	8"	#5 bars @ 6" c.c.	5
48"	5'-9"	6'-2"	13"	10"	6-1/2"	8"	#5 bars @ 5" c.c.	5
54"	6'-3"	6'-8"	13"	10"	6-1/2"	8"	#6 bars @ 8" c.c.	5
60"	6'-9"	7'-2"	13"	10"	6-1/2"	8"	#6 bars @ 6" c.c.	5

QUANTITIES PER LINEAR FOOT				
SIZE	Class A Conc.	Brick (Flat)	Brick (On Edge)	STEEL
24"	0.0864 Cu. Yds.	0.1724 Cu. Yds.	0.0518 Cu. Yds.	7.235 lbs.
27"	0.0926	0.1920	0.0573	8.934
30"	0.0988	0.2121	0.0627	10.369
33"	0.1049	0.2327	0.0682	12.286
36"	0.1111	0.2538	0.0736	14.968
42"	0.1749	0.4374	0.0845	16.576
48"	0.1903	0.4985	0.0954	20.474
54"	0.2058	0.5616	0.1064	20.344
60"	0.2212	0.6266	0.1173	27.513

	APPROVED:	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 830.05		
			SCALE: NONE	SHEET 1 OF 1	

* For Pipes 60" And Larger in Diameter,
Trench Width Varies from OD+24"
Minimum To OD+36" Maximum.



REINFORCED CONCRETE PIPE						
DIMENSIONS					CUBIC YARDS PER LIN. FT.	
D	OD	ODB	A	B	MIN.	MAX.
15"	19"	23"	4"	5"	0.0748	0.0933
18"	22 $\frac{1}{2}$ "	27"	5"	6"	0.1001	0.1227
21"	25 $\frac{3}{4}$ "	30 $\frac{1}{2}$ "	6"	7"	0.1260	0.1527
24"	29"	34"	6"	8"	0.1423	0.1711
27"	32 $\frac{1}{4}$ "	37 $\frac{1}{2}$ "	7"	8"	0.1655	0.1964
30"	36"	41 $\frac{1}{2}$ "	8"	9"	0.2007	0.2357
33"	39 $\frac{1}{2}$ "	45 $\frac{1}{2}$ "	9"	10"	0.2377	0.2768
36"	42 $\frac{3}{4}$ "	49"	9"	11"	0.2597	0.3009
42"	50"	57 $\frac{1}{2}$ "	11"	13"	0.3500	0.3994
48"	57"	66"	12"	15"	0.4311	0.4867
54"	64"	72 $\frac{1}{2}$ "	14"	16"	0.5220	0.5837
60"	72"	75 $\frac{1}{2}$ "	15"	18"	0.6106	0.7124
66"	79"	81"	17"	20"	0.7303	0.8445
72"	86"	88"	18"	22"	0.8297	0.9532

EXTRA STRENGTH CLAY PIPE						
DIMENSIONS					CUBIC YARDS PER LIN. FT.	
D	OD	ODB	A	B	MIN.	MAX.
15"	18 $\frac{11}{16}$ "	22"	4"	5"	0.0727	0.0912
18"	22 $\frac{7}{16}$ "	26 $\frac{1}{2}$ "	5"	6"	0.0987	0.1213
21"	26 $\frac{3}{8}$ "	30"	6"	7"	0.1235	0.1502
24"	30 $\frac{1}{16}$ "	34"	6"	8"	0.1413	0.1701
27"	33 $\frac{5}{8}$ "	39"	7"	8"	0.1701	0.2010
30"	37 $\frac{1}{8}$ "	43"	8"	9"	0.2066	0.2416



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

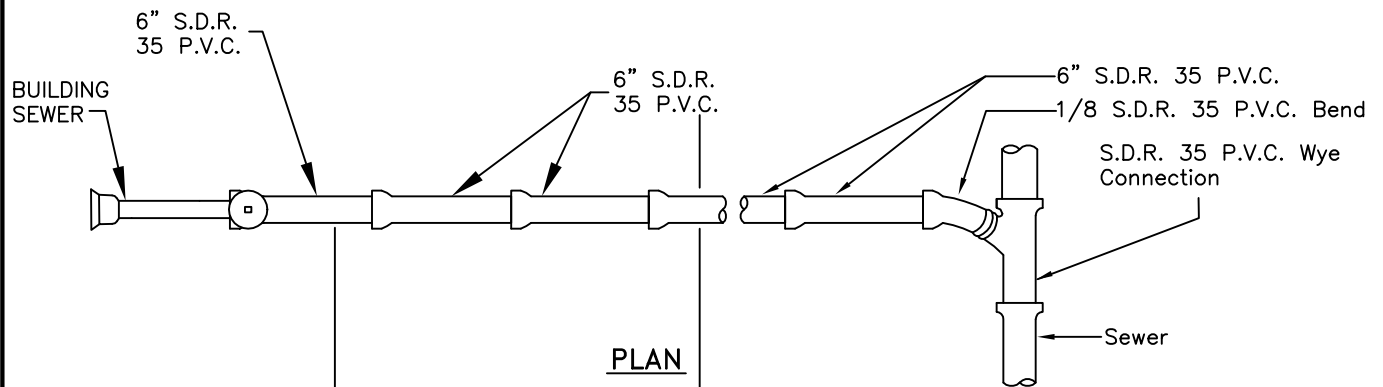
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

CONCRETE CRADLE
FOR SANITARY SEWERS

ISSUED	REVISED	REVISED
3 / 2008		

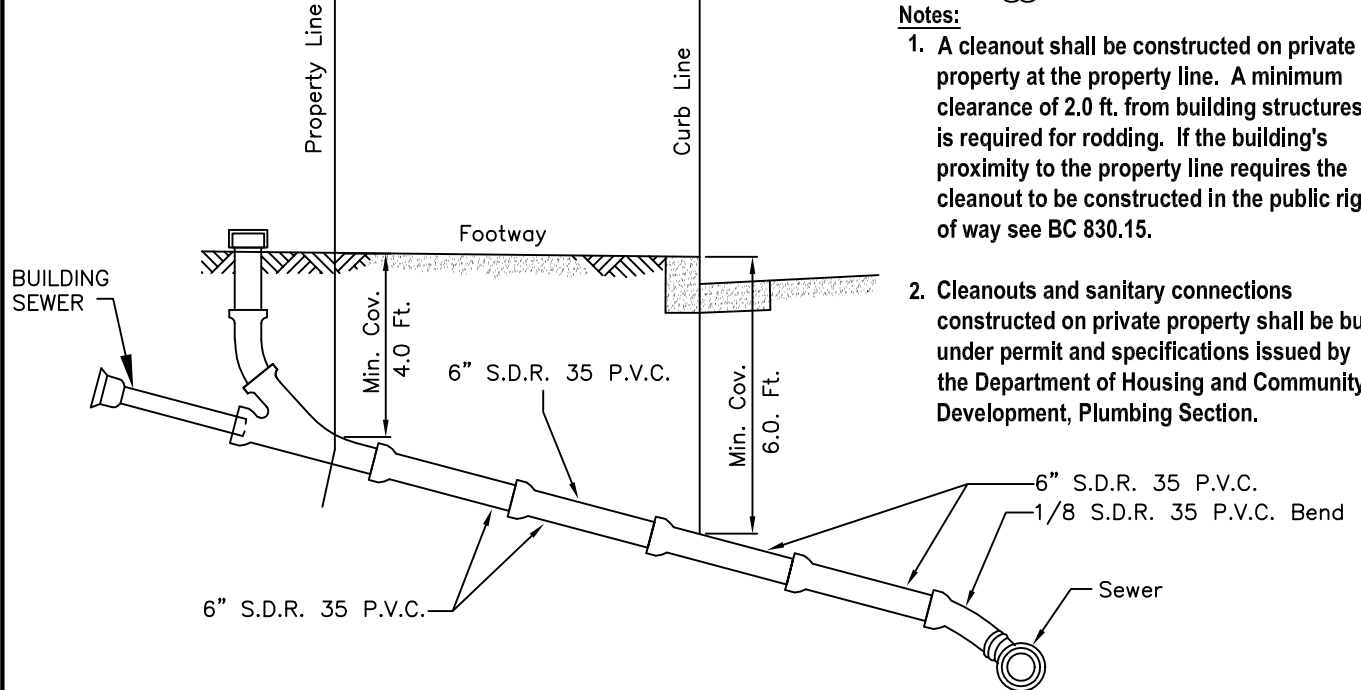
STANDARD NO.
BC 830.06

SCALE : NONE	SHEET 1 OF 1
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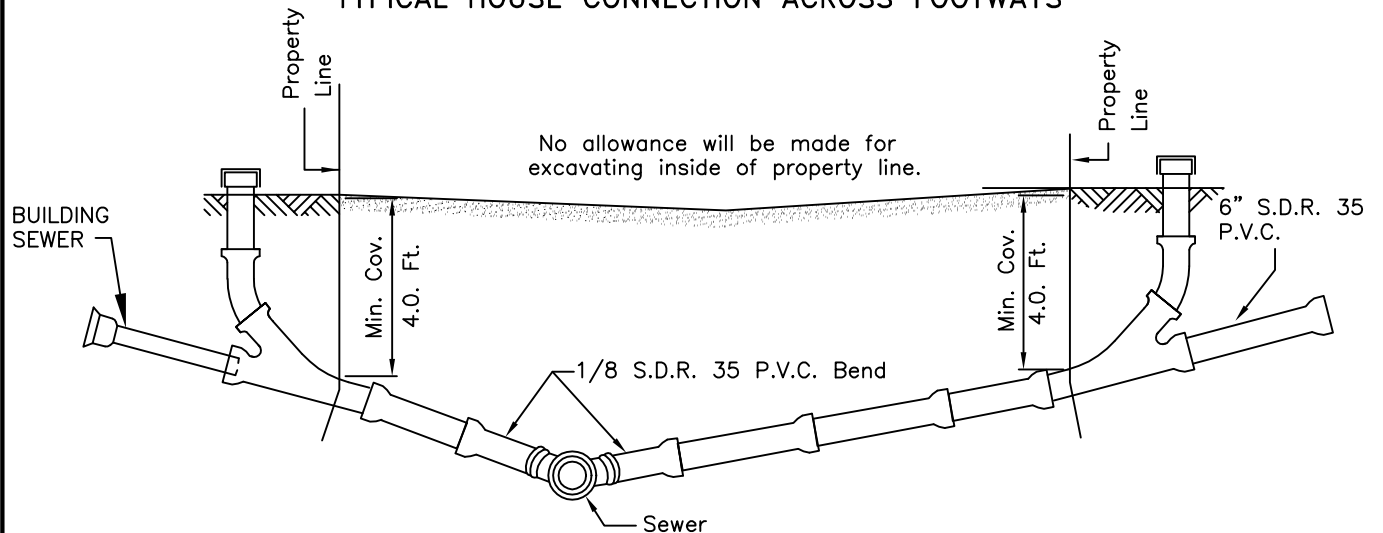
Notes:

1. A cleanout shall be constructed on private property at the property line. A minimum clearance of 2.0 ft. from building structures is required for rodding. If the building's proximity to the property line requires the cleanout to be constructed in the public right of way see BC 830.15.
2. Cleanouts and sanitary connections constructed on private property shall be built under permit and specifications issued by the Department of Housing and Community Development, Plumbing Section.



ELEVATION

TYPICAL HOUSE CONNECTION ACROSS FOOTWAYS



TYPICAL HOUSE CONNECTION IN ALLEYS



APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

**CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER**

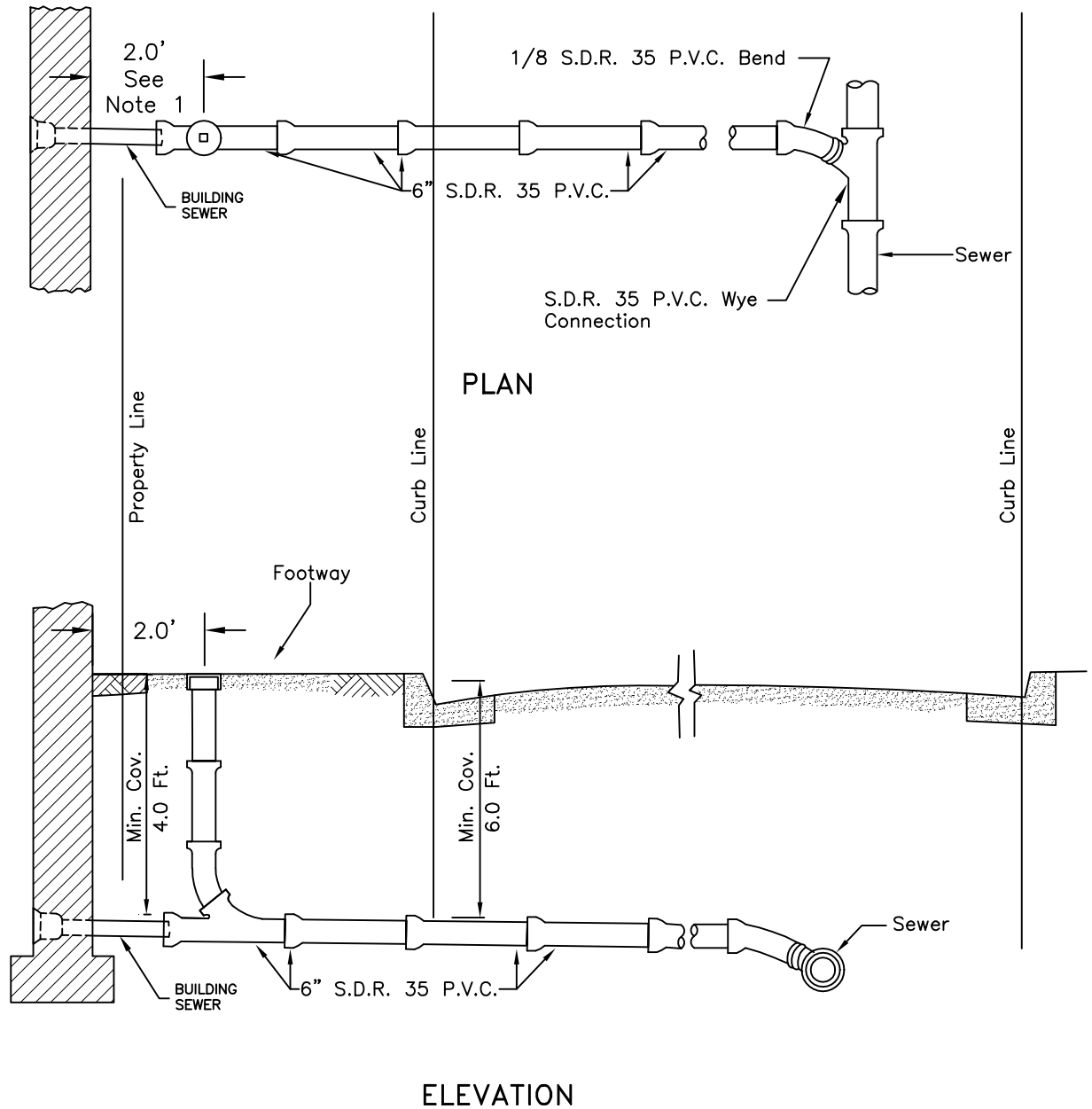
**TYPICAL INSTALLATIONS
 OF SANITARY HOUSE
 CONNECTIONS**

ISSUED	REVISED	REVISED
3 / 2008		

**STANDARD NO.
 BC 830.14**


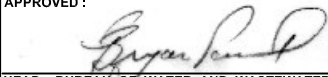
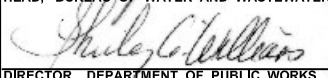
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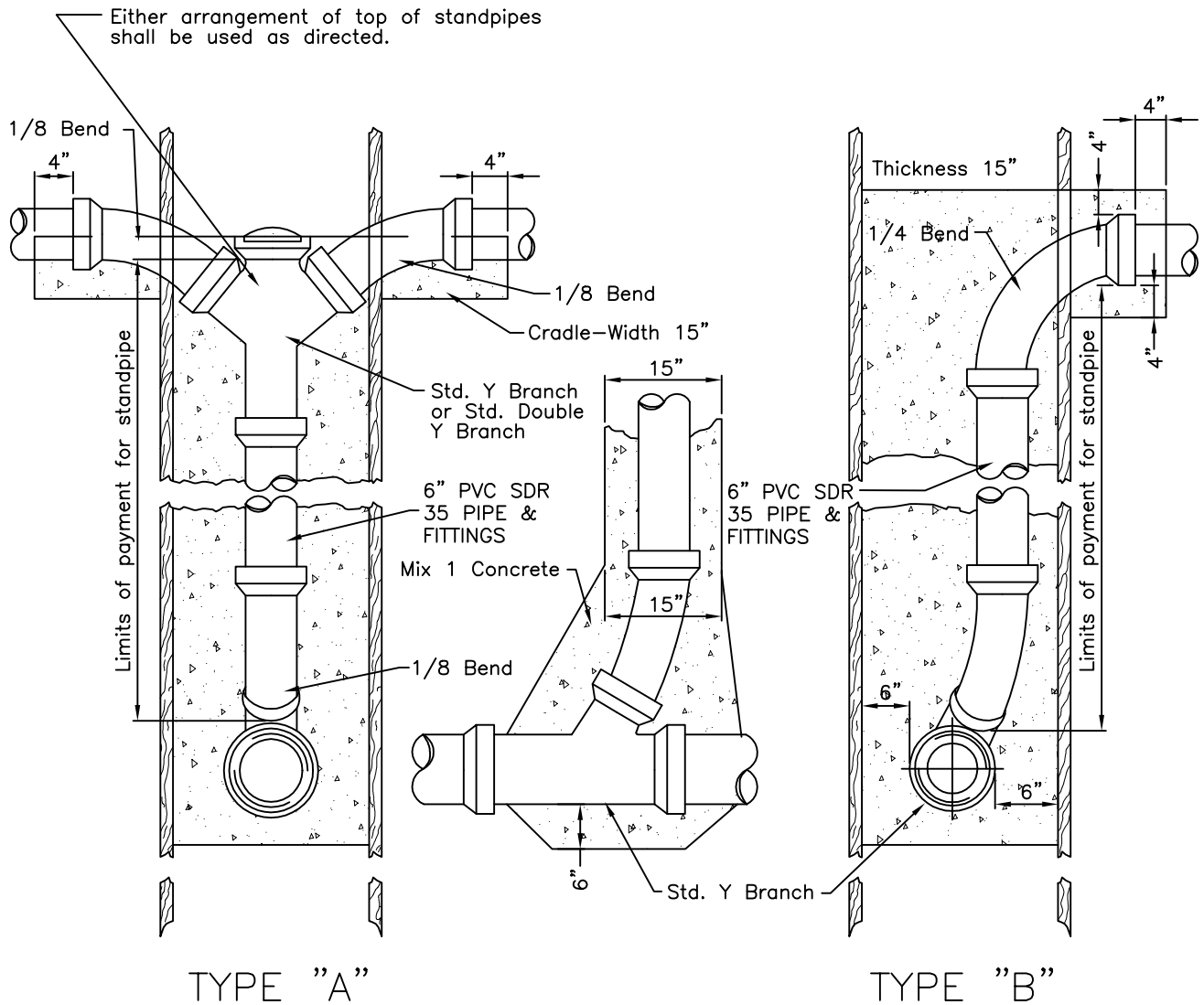
SHEET 1 OF 1



Notes:


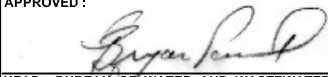
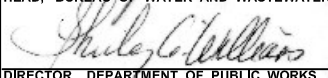
1. All cleanouts shall be constructed on private property under permits issued by the Department of Housing and Community Development, Plumbing Section. However, when the building's proximity to the property line requires the cleanout to be built in the public right of way the cleanout shall be built under permit issued by the Department of Public Works, Wastewater Engineering Office.
2. See BC 831.29 for cleanout cover.

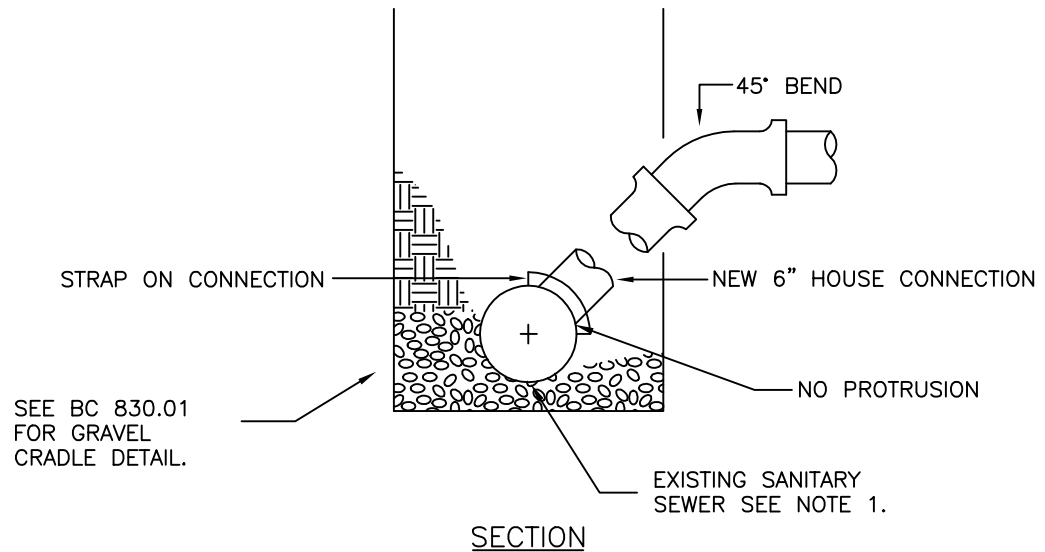
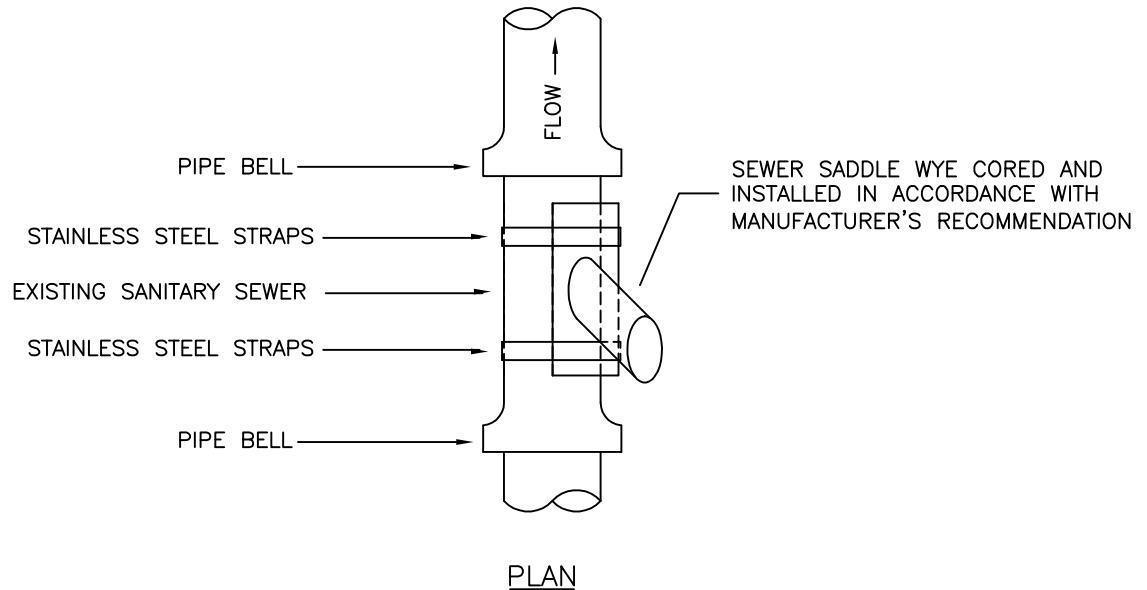
	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 830.15		
TYPICAL HOUSE CONNECTION WITH CLEANOUT IN PUBLIC RIGHT-OF-WAY			SCALE : NONE SHEET 1 OF 1		



Note:

House connections to be laid not less than 15" below cellar floor if depth of sewer will allow except where "Written Request" is made for connection above floor; connections must be placed at greater depth wherever necessary to properly drain fixtures in cellar.

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED 3 / 2008	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	TYPICAL INSTALLATIONS OF STANDPIPE HOUSE CONNECTIONS	STANDARD NO. BC 830.16		
			SCALE : NONE	SHEET 1 OF 1	



NOTES:

1. Existing sewer main shall be at least 10 inches in diameter for 6 inch house connections when using a sewer saddle. When sewer main is less than 10" in diameter, then pipe replacement method shall be used as shown on Standard Detail BC 830.18. A manhole shall be used when the house connection is 8" or larger.
2. Contractor shall maintain all flows in accordance with all state and local requirements.
3. When directed by the City, concrete encase saddle connection in accordance with Standard Detail BC 830.04.



APPROVED :

[Signature]
 HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

SADDLE INSTALLATION
 DETAIL FOR NEW HOUSE
 CONNECTION TO
 EXISTING SEWER

ISSUED

REVISED

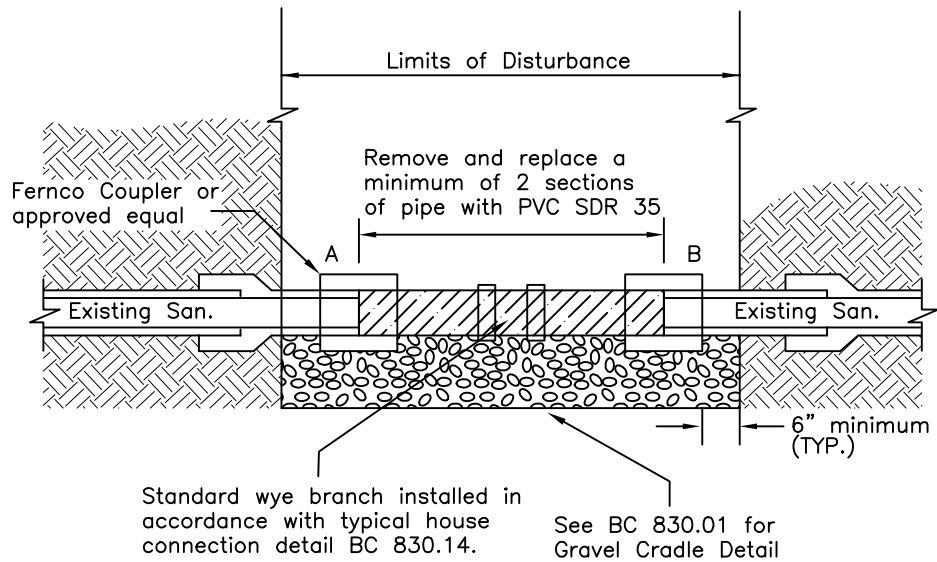
REVISED

3 / 2008

STANDARD NO.
 BC 830.17

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. Saw cut pipe at station A and B unless pipe bell corresponds with location.
2. Offset pipe joints will not be permitted.
3. Where existing pipe is at least 10" or larger, a sewer saddle may be used as shown in standard detail BC 830.17.
4. Contractor shall maintain all flows in accordance with all state and local requirements.



APPROVED :

HEAD, BUREAU OF WATER AND WASTEWATER

DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

PIPE REPLACEMENT DETAIL
FOR NEW HOUSE CONNECTIONS
TO EXISTING SEWERS

ISSUED

REVISED

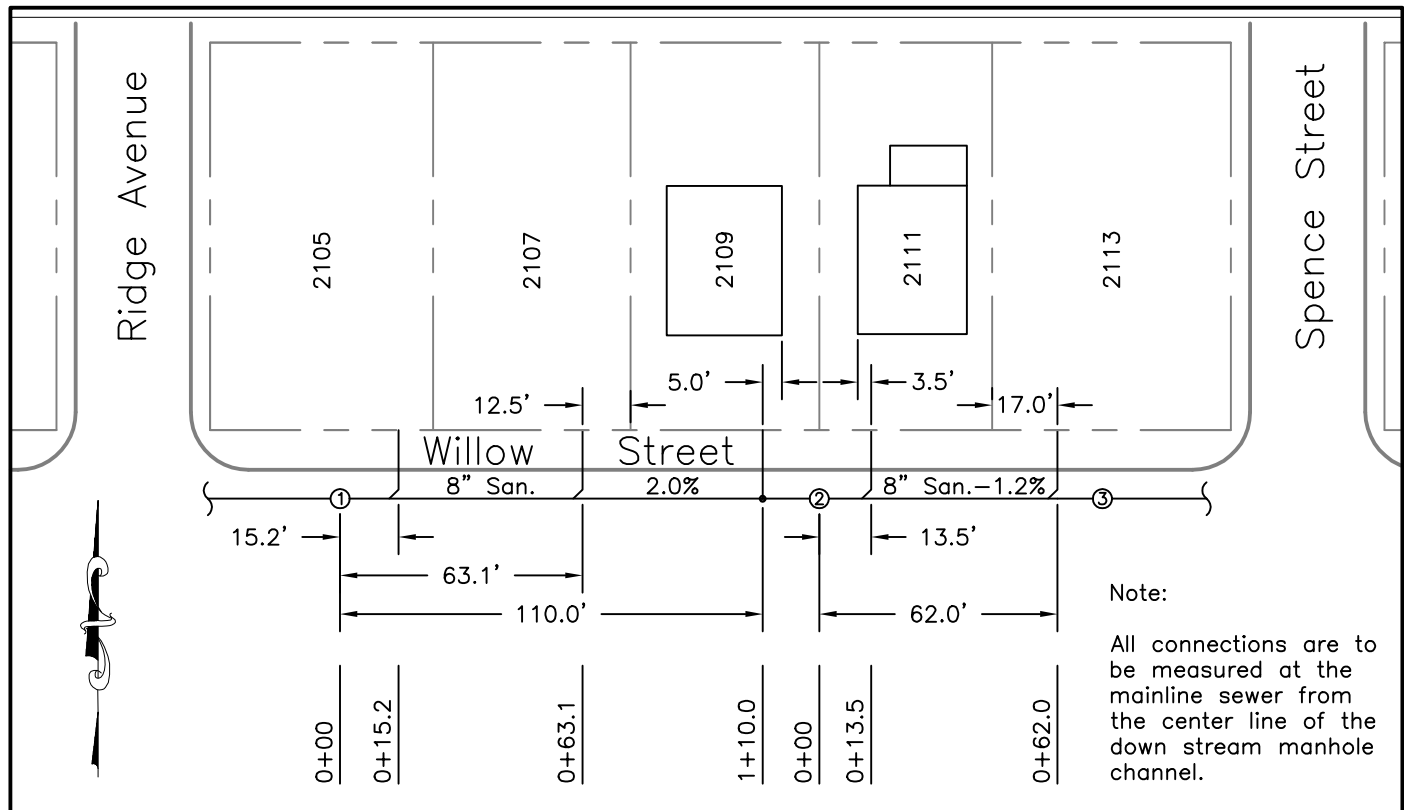
REVISED

3 / 2008

STANDARD NO.
BC 830.18

SCALE : NONE

SHEET 1 OF 1



*See Sheet 2 of 2 for form.

Willow St. from Ridge Ave. to Spence St. PREPARER'S NAME
M.H. 1 to M.H. 2 COMPLETION DATE 07/10/90

HOUSE No.	FRONT REAR OR SIDE	STA. OF Y	SIZE/ TYPE	STAND- PIPE *	LOCATION AT R/W OR PROPERTY LINE	COVER **	
				SIZE LENGTH AND KIND		At Curb	At P.L.
2105	Front	0 + 15.2	6" PVC		Blind 'Y'		
2107	Front	0 + 63.1	6" PVC		12.5' West of East Property Line		9.2'
2109	Front	1 + 10.0	6" PVC	4.5'	5.0' West of East Wall of House		6.0'

Willow St. from Ridge Ave. to Spence St. PREPARER'S NAME
M.H. 2 to M.H. 3 COMPLETION DATE 07/10/90

HOUSE No.	FRONT REAR OR SIDE	STA. OF Y	SIZE/ TYPE	STAND- PIPE *	LOCATION AT R/W OR PROPERTY LINE	COVER **	
				SIZE LENGTH AND KIND		At Curb	At P.L.
2111	Front	0 + 13.5	6" PVC		3.5' East of West Wall of House		5.4'
2113	Front	0 + 62.0	6" PVC		17.0' East of West Property Line	6.1'	

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED	
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008			
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 830.19			
			MEASURING AND RECORDING AS-BUILT LOCATION OF NEW SANITARY HOUSE CONNECTIONS		SCALE : NONE	SHEET 1 OF 2

M.H. to M.H.

[illegible]

***NOTE COVER AT CURB LINE ONLY IF
DIFFERENT THAN P.L. OR IF CONNECTION
DOESN'T EXTEND TO P.L.

* NOTE IF THIS IS A DOUBLE STANDPIPE CONNECTION AND ALSO STATE COVER FROM GROUND LINE TO TOP PF STANDPIPE



APPROVED :

HEAD, BUREAU OF WATER AND WASTEWATER

DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

MEASURING AND RECORDING AS-BUILT LOCATION OF NEW SANITARY HOUSE CONNECTIONS

ISSUED

REVISÉ

REVISÉ

3 / 2008

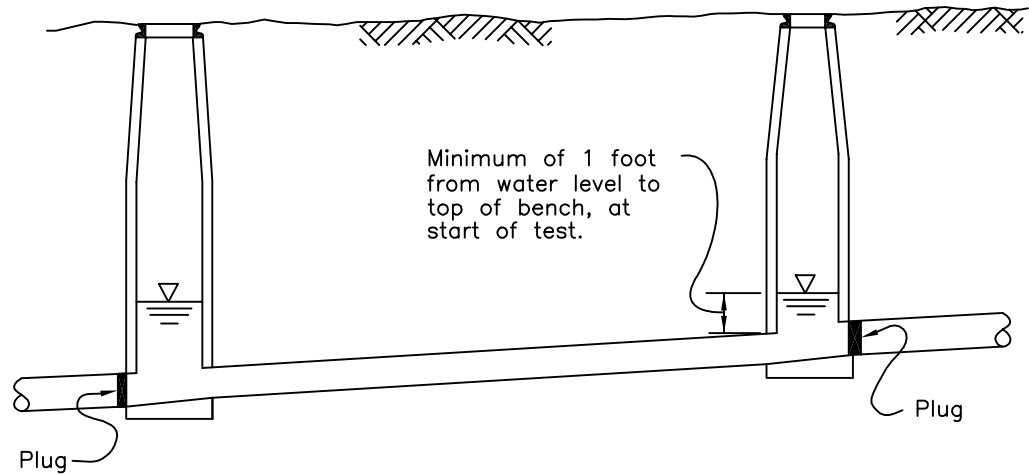
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BC 830.19

SCALE : NONE

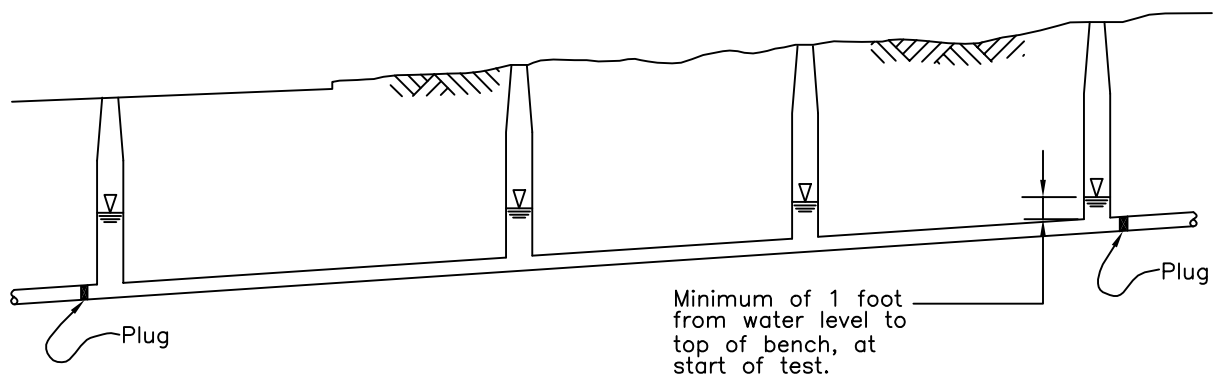
SHEET 2 OF 2

NOTES:


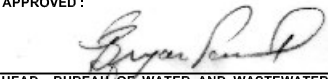
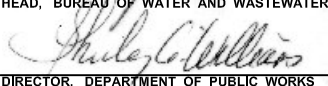
Plug any newly installed house connections at property line prior to testing.

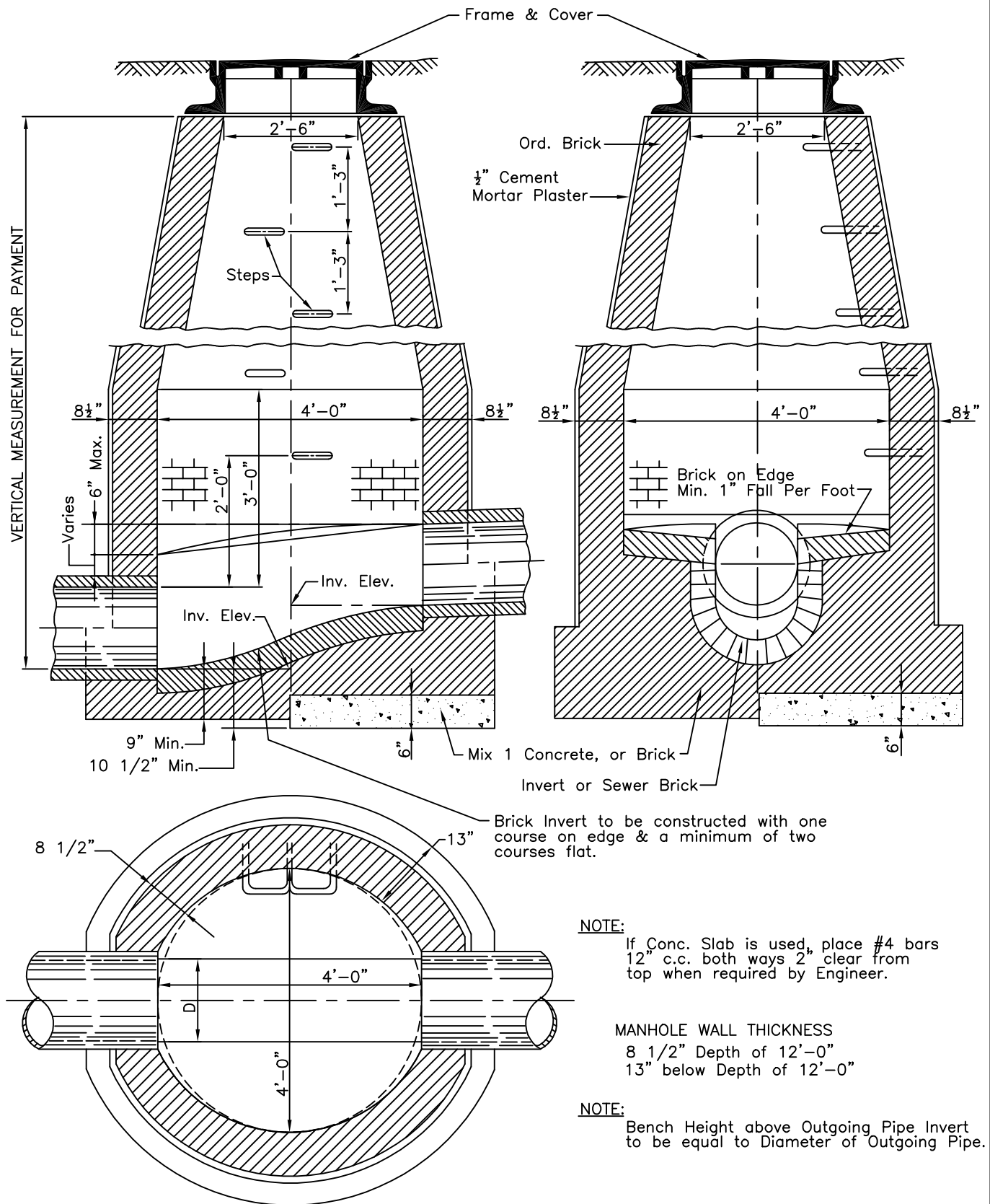


SINGLE SECTIONS



MULTIPLE SECTIONS

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 830.20		
TYPICAL DETAIL FOR LEAKAGE EXFILTRATION TESTING			SCALE : NONE		
			SHEET 1 OF 1		



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
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BUREAU OF WATER AND WASTEWATER

STANDARD BRICK SANITARY
MANHOLE

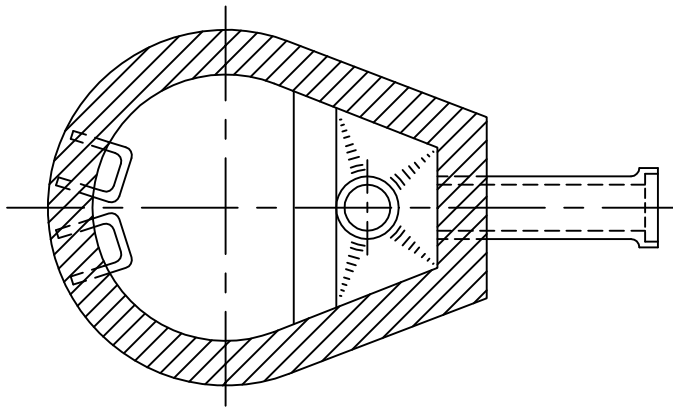
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 831.01

SCALE : NONE

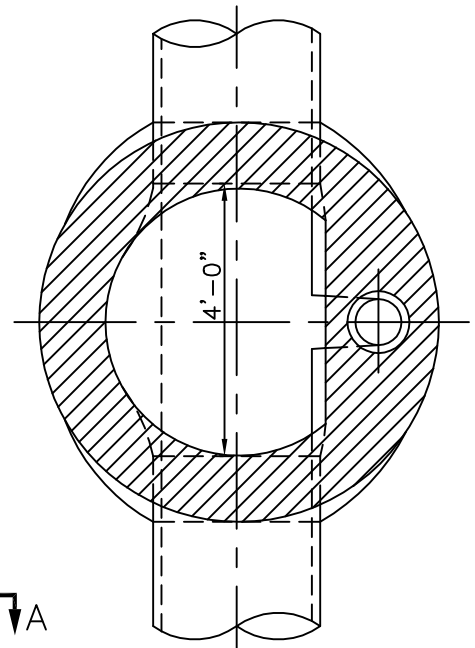
SHEET 1 OF 1

MANHOLE WALL THICKNESS
8" To Depth of 12'-0"
12" Below Depth of 12'-0"



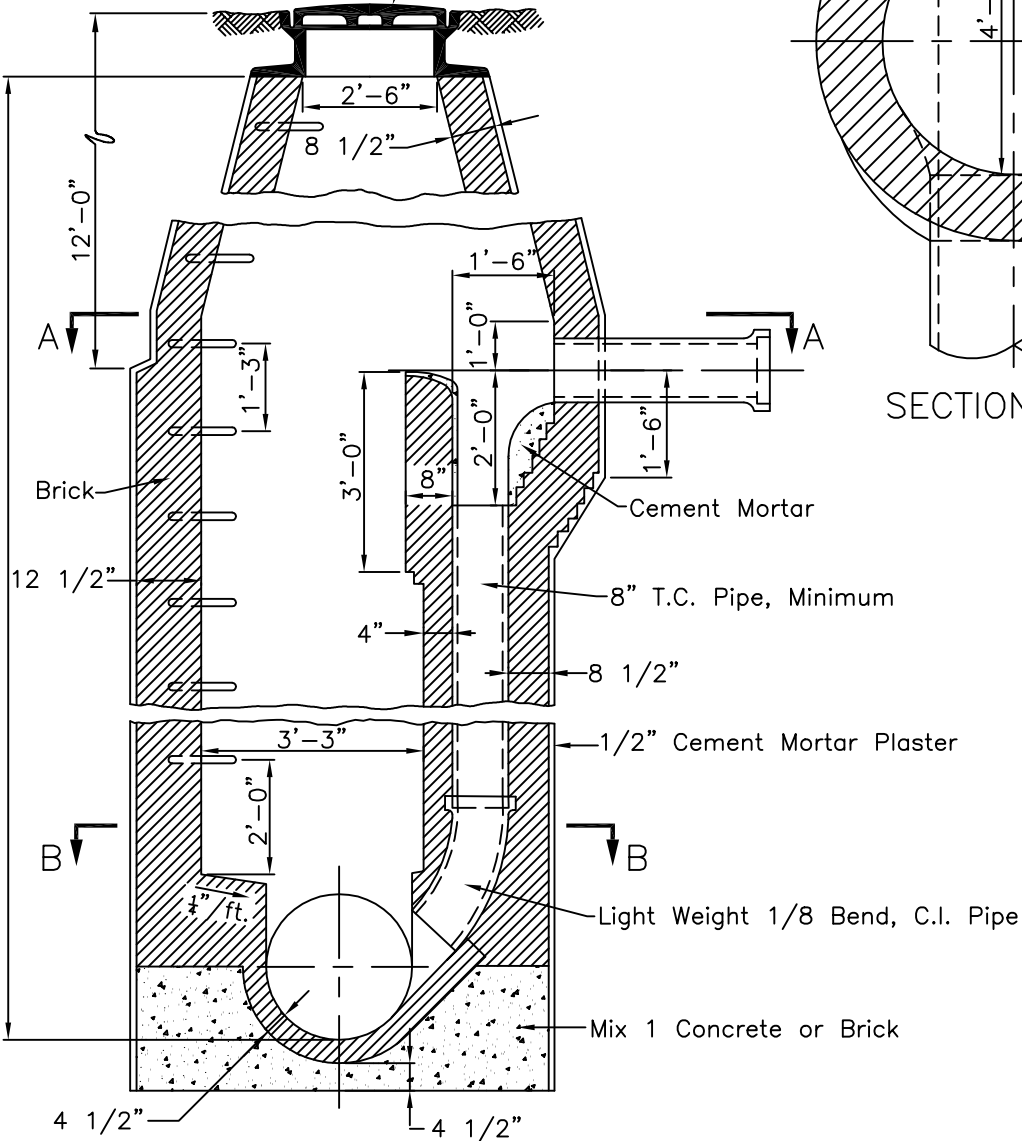
SECTION A-A



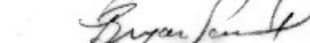
Frame and Cover

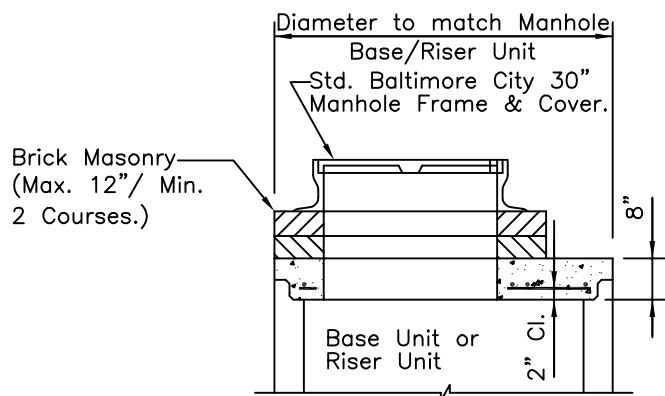


SECTION B-B

VERTICAL MEASUREMENT FOR PAYMENT



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			3 / 2008		
	HEAD, BUREAU OF WATER AND WASTEWATER	STANDARD MANHOLE TYPE C	STANDARD NO. BC 831.02		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		SCALE : NONE	SHEET 1 OF 1	



SECTION-A-A

NOTES:

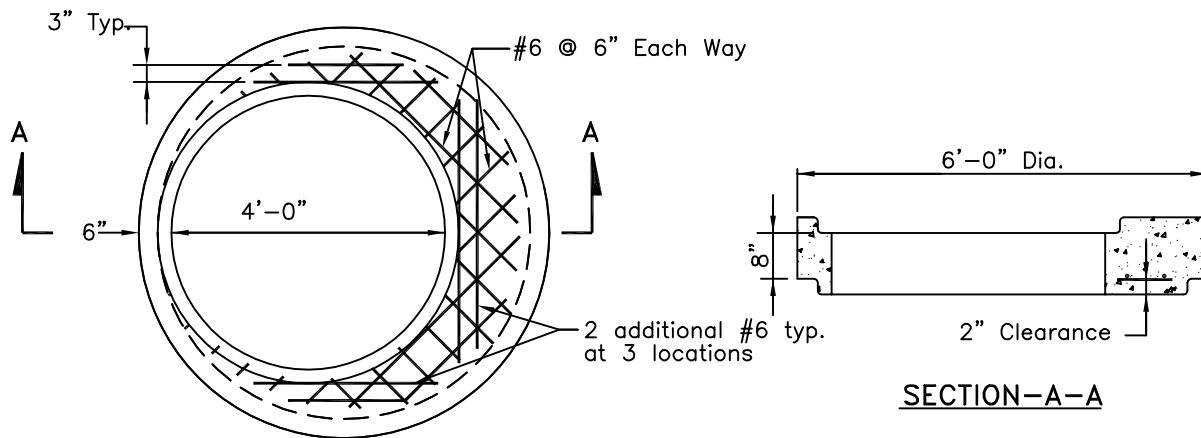
-
- 8" Min.
- Manhole Step See Note 3
- Eccentric Cone Unit
- Varies 2'-0" to 4'-0"
- 5" Riser Unit
- 4'-0" Dia.
- Varies 1'-0" to 6'-0"
- Brick Channel See Notes 5 and 6
- See Note 9
- Base Unit
- Varies 3'-0" to 6'-0"
- Flanged Concrete Base (Optional)
- 6" Min.
- 12" 8"
- Aggregate Bedding (1/4" to 3/4" Gravel)
- Diagram Description: This technical cross-section diagram illustrates the vertical assembly of a manhole. At the top, an 'Eccentric Cone Unit' is shown with a minimum thickness of 8 inches. Below it is a 'Riser Unit' with a 4-foot 0-inch diameter and a 5-inch wall thickness. A 'Brick Channel' is located between the riser and the base unit, with a 2-foot 0-inch height. The 'Base Unit' sits on a 'Flanged Concrete Base (Optional)' which has a minimum 6-inch thickness. The entire assembly is supported by 'Aggregate Bedding' consisting of 1/4" to 3/4" gravel, with a 12-inch layer directly under the base unit and an 8-inch layer under the concrete base. Vertical dimensions on the right indicate that the height of the Eccentric Cone Unit varies from 2'-0" to 4'-0", the Riser Unit varies from 1'-0" to 6'-0", and the Base Unit varies from 3'-0" to 6'-0". Other dimensions include a 5-inch riser wall thickness, a 2'-0-inch brick channel height, and a 4'-0-inch diameter for the riser. A 'Manhole Step' is indicated on the left side of the riser unit, and 'Joints' are noted on the left side of the base unit. The entire assembly is shown within a concrete structure with aggregate bedding at the bottom.



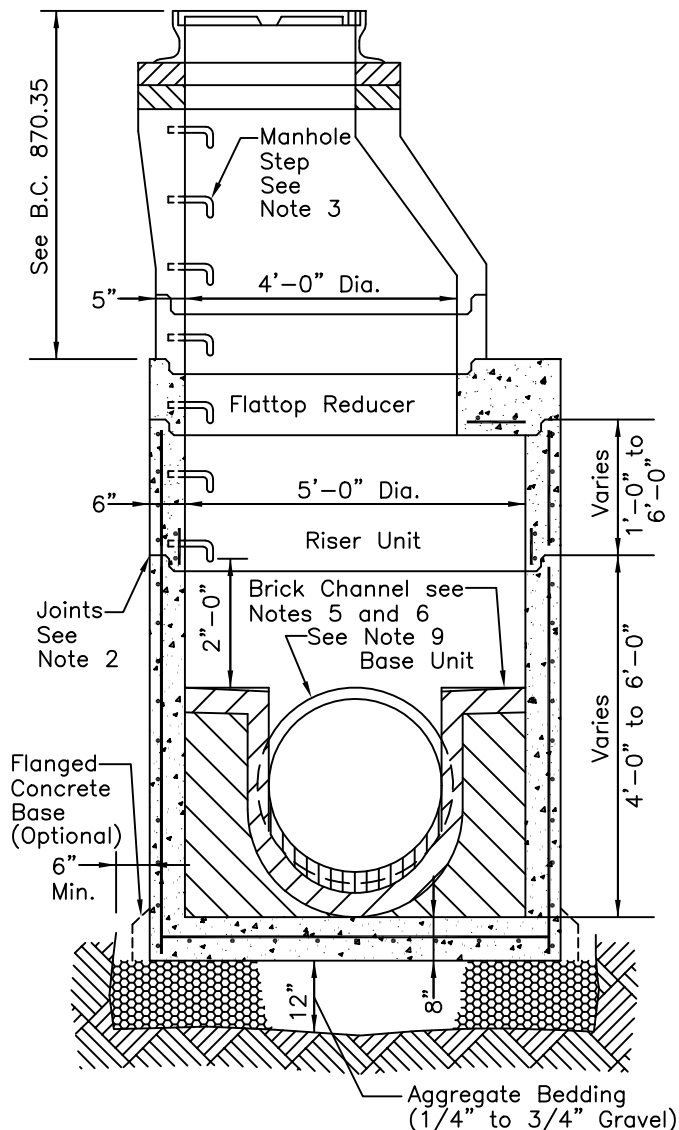
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

**48" DIAMETER PRECAST
SANITARY MANHOLE FOR PIPE
DIAMETERS UP TO 24"**

SHEET 1 OF 1



FLATTOP REDUCER



NOTES:

1. Manhole design specifications shall conform to "Precast Reinforced Concrete Manhole Section A.S.T.M. designation C-478, latest revisions".
2. The manufacturer shall form male and female ends of joints using their own design. The joints shall be sealed by the contractor and made water tight using 'O' ring rubber gaskets meeting A.S.T.M. C-443 and C-361. Any excessive openings within the joints shall be filled using a non-shrinking grout filler.
3. Manhole steps shall be installed by the manufacturer in vertical alignment at 1'-0" typical c/c. Manhole steps shall be incidental to the cost of the manhole.
4. Lift holes or eyes shall be provided in each section for handling. When directed by the Engineer, these holes shall be plugged with water tight stoppers or a non-shrinking grout after installation.
5. Bench and channel to be constructed of one course of sewer brick on edge. Bench to slope a minimum of 1" per foot towards channel.
6. Bench height above outgoing pipe invert to be equal to the diameter of the outgoing pipe or as directed by the Engineer.
7. Use flat top slab when manhole length is not sufficient for eccentric cone unit.
8. Vertical measurement for payment shall be from the invert of the outgoing pipe to the bottom of the manhole frame.
9. The pipe shall be sealed at manhole using an "A-Lok" gasket as manufactured by A-LOK Products Inc. or an approved equal meeting A.S.T.M. C-923, cast integrally in the manhole wall.



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60" DIAMETER PRECAST
SANITARY MANHOLE FOR PIPE
DIAMETERS UP TO 36"

ISSUED

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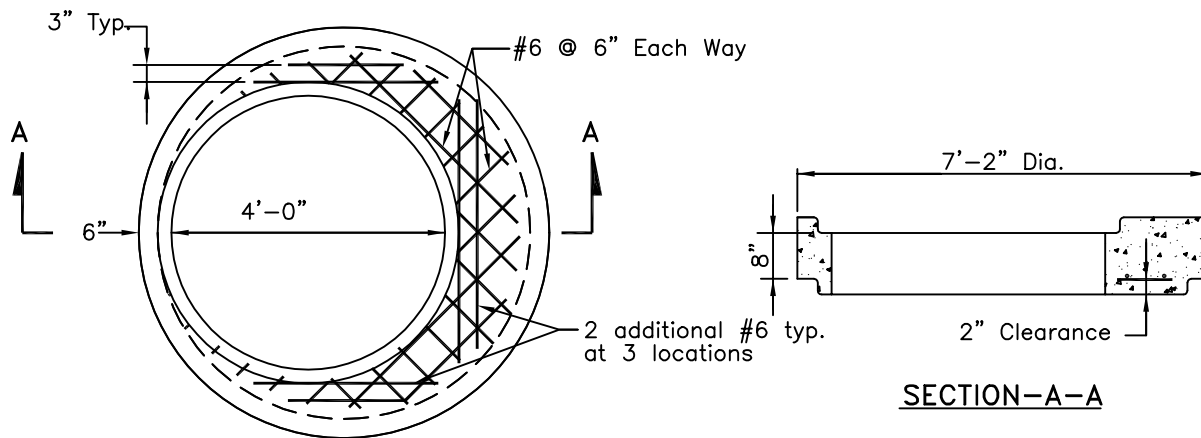
REVISED

3 / 2008

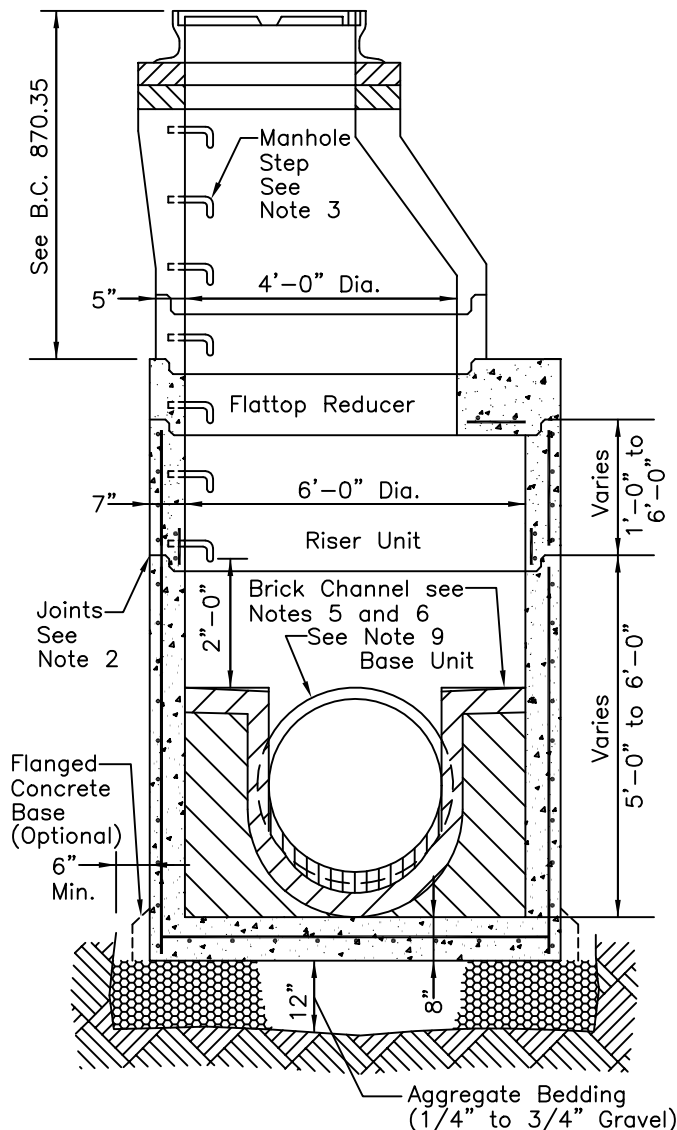
STANDARD NO.
BC 831.05

SCALE: NONE

SHEET 1 OF 1



FLATTOP REDUCER



NOTES:

1. Manhole design specifications shall conform to "Precast Reinforced Concrete Manhole Section A.S.T.M. designation C-478, latest revisions".
2. The manufacturer shall form male and female ends of joints using their own design. The joints shall be sealed by the contractor and made water tight using 'O' ring rubber gaskets meeting A.S.T.M. C-443 and C-361. Any excessive openings within the joints shall be filled using a non-shrinking grout filler.
3. Manhole steps shall be installed by the manufacturer in vertical alignment at 1'-0" typical c/c. Manhole steps shall be incidental to the cost of the manhole.
4. Lift holes or eyes shall be provided in each section for handling. When directed by the Engineer, these holes shall be plugged with water tight stoppers or a non-shrinking grout after installation.
5. Bench and channel to be constructed of one course of sewer brick on edge. Bench to slope a minimum of 1" per foot towards channel.
6. Bench height above outgoing pipe invert to be equal to the diameter of the outgoing pipe or as directed by the Engineer.
7. Use flat top slab when manhole length is not sufficient for eccentric cone unit.
8. Vertical measurement for payment shall be from the invert of the outgoing pipe to the bottom of the manhole frame.
9. The pipe shall be sealed at manhole using an "A-Lok" gasket as manufactured by A-LOK Products Inc. or an approved equal meeting A.S.T.M. C-923, cast integrally in the manhole wall.



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72" DIAMETER PRECAST
SANITARY MANHOLE FOR PIPE
DIAMETERS UP TO 48"

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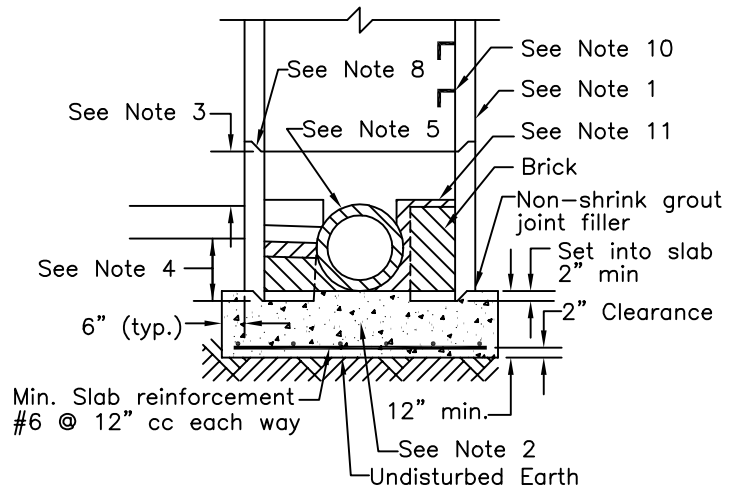
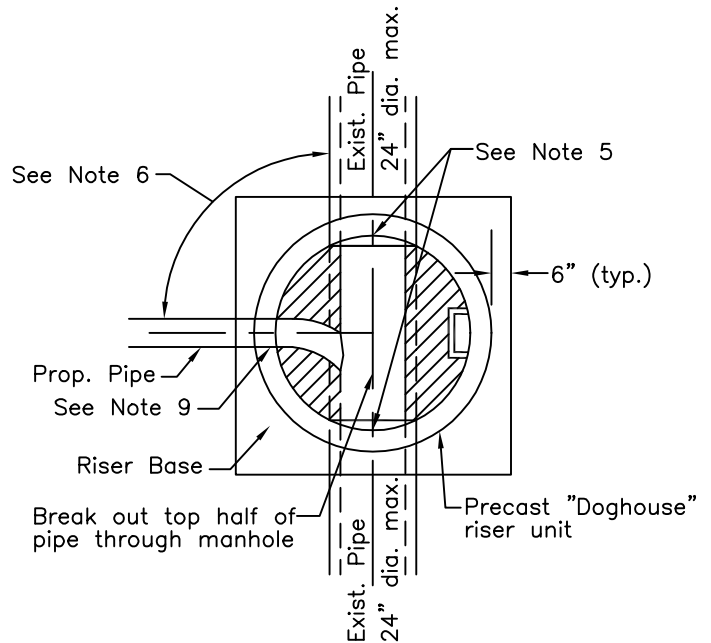
STANDARD NO.
BC 831.06

SCALE : NONE

SHEET 1 OF 1

NOTES:

1. Manhole design specifications shall conform to "Precast Reinforced Concrete Manhole Section A.S.T.M. designation C-478, latest revisions".
2. Manhole base shall be Mix No. 3 (3,500 psi) poured-in-place concrete.
3. Provide 12" minimum clearance from top of highest pipe opening to upper riser joint.
4. Provide 6" minimum clearance from incoming pipe opening to bottom of doghouse unit.
5. Minimum 1" clearance shall be maintained between existing pipes and precast doghouse pipe openings. Openings shall be grouted with non-shrink grout joint filler.
6. Locate centerline of proposed incoming pipe a maximum of 90 degrees from existing incoming pipe, on either side of manhole. In all cases, a minimum 1' wide section of manhole wall shall be maintained between pipe openings in doghouse base unit.
7. See standard detail BC-831.04 for precast sanitary manhole risers use with doghouse riser shown.
8. The manufacturer shall form male and female ends of joints using their own designs. The joints shall be sealed by the contractor and made water tight using "O" ring rubber gaskets meeting A.S.T.M. C-443 and C-361. Any excessive openings within the joints shall be filled using a non-shrink grout filler.
9. The proposed pipe shall be sealed at manhole using an "A-LOK" gasket as manufactured by A-LOK Products Inc. or an approved equal meeting A.S.T.M. C-923, cast integrally in the manhole wall.
10. Ladder rungs shall be supplied and installed by the manufacturer in vertical alignment at 1'-0" typical c/c. Rung type shall be in accordance with Standard B.C.-831.31. Ladder rungs shall be incidental to the cost of the manhole.
11. Bench and channel to be constructed of one course of sewer brick on edge. Bench to slope a minimum of 1" per foot towards channel.



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48" DIAMETER PRECAST
"DOGHOUSE" RISER FOR PIPE
DIAMETERS UP TO 24"
TITLE LINE 4

ISSUED

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3 / 2008

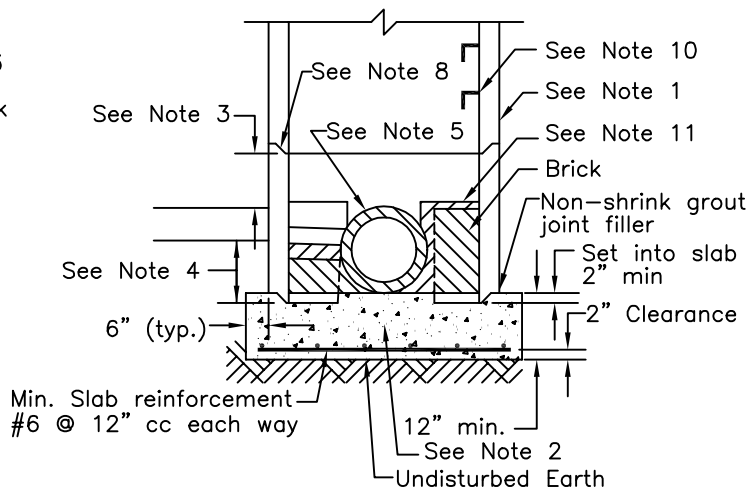
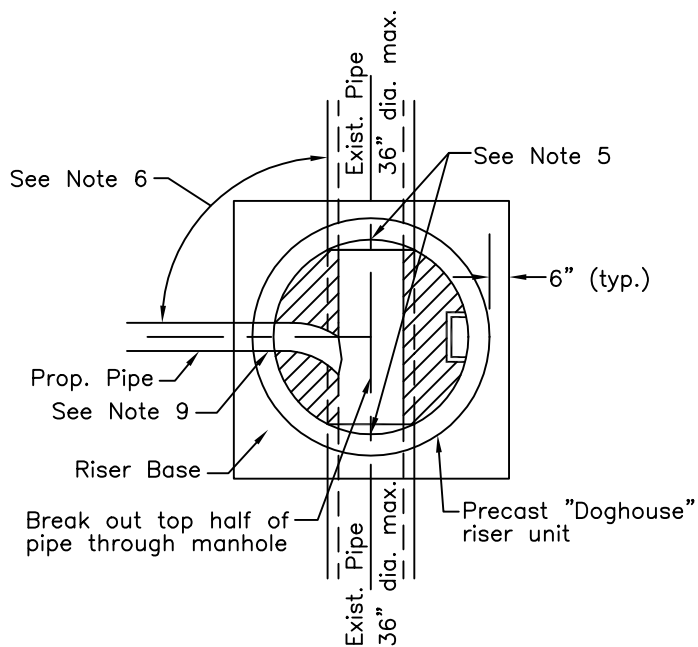
STANDARD NO.
BC 831.07

SCALE: NONE

SHEET 1 OF 1

NOTES:

1. Manhole design specifications shall conform to "Precast Reinforced Concrete Manhole Section A.S.T.M. designation C-478, latest revisions".
2. Manhole base shall be Mix No. 3 (3,500 psi) poured-in-place concrete.
3. Provide 12" minimum clearance from top of highest pipe opening to upper riser joint.
4. Provide 6" minimum clearance from incoming pipe opening to bottom of doghouse unit.
5. Minimum 1" clearance shall be maintained between existing pipes and precast doghouse pipe openings. Openings shall be grouted with non-shrink grout joint filler.
6. Locate centerline of proposed incoming pipe a maximum of 90 degrees from existing incoming pipe, on either side of manhole. In all cases, a minimum 1' wide section of manhole wall shall be maintained between pipe openings in doghouse base unit.
7. See standard detail BC-831.05 for precast sanitary manhole risers use with doghouse riser shown.
8. The manufacturer shall form male and female ends of joints using their own designs. The joints shall be sealed by the contractor and made water tight using "O" ring rubber gaskets meeting A.S.T.M. C-443 and C-361. Any excessive openings within the joints shall be filled using a non-shrink grout filler.
9. The proposed pipe shall be sealed at manhole using an "A-LOK" gasket as manufactured by A-LOK Products Inc. or an approved equal meeting A.S.T.M. C-923, cast integrally in the manhole wall.
10. Ladder rungs shall be supplied and installed by the manufacturer in vertical alignment at 1'-0" typical c/c. Rung type shall be in accordance with Standard B.C.-831.31. Ladder rungs shall be incidental to the cost of the manhole.
11. Bench and channel to be constructed of one course of sewer brick on edge. Bench to slope a minimum of 1" per foot towards channel.



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**60" DIAMETER PRECAST
"DOGHOUSE" RISER FOR PIPE
DIAMETERS UP TO 36"**

ISSUED

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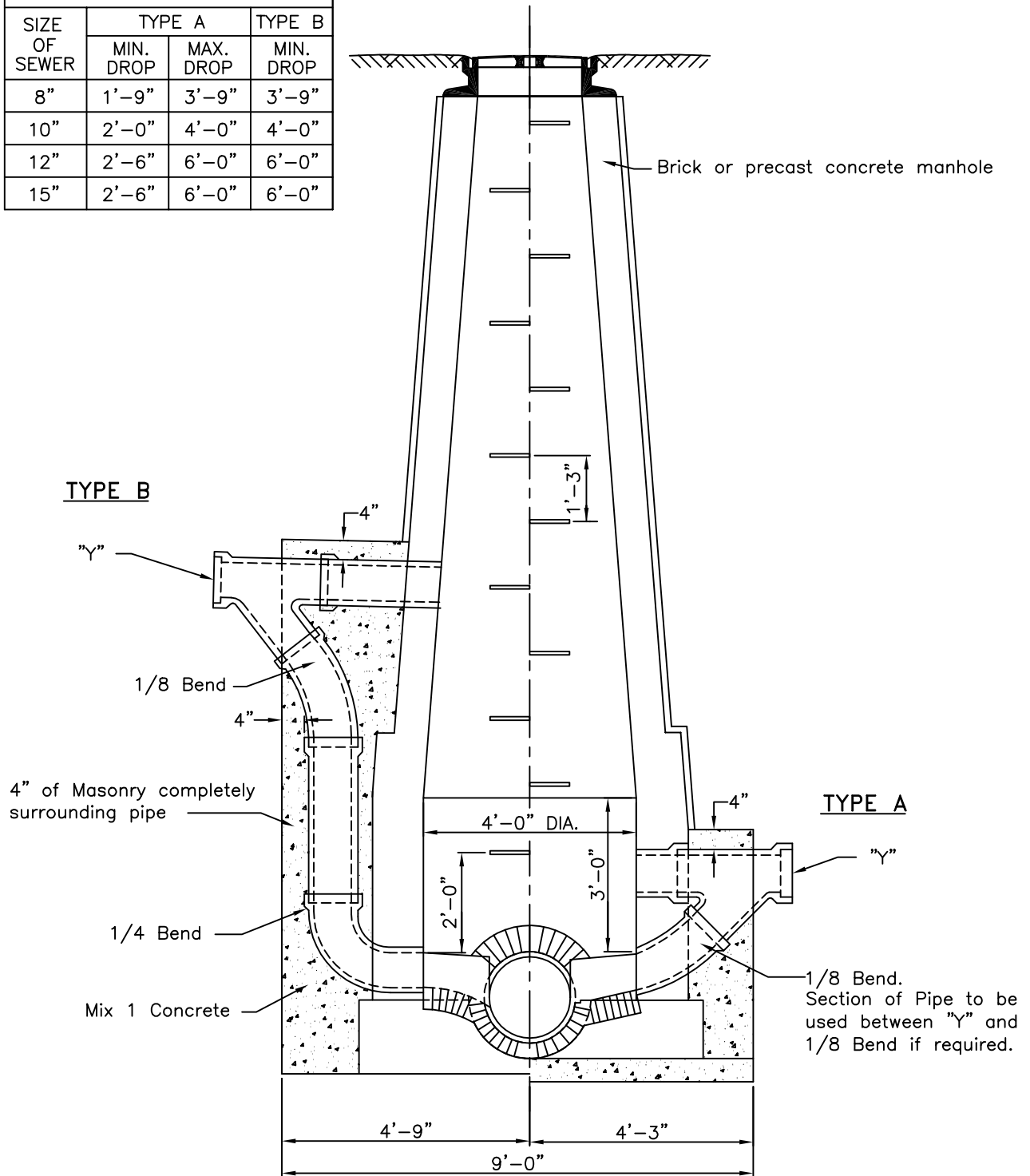
3 / 2008

STANDARD NO.
BC 831.08

SCALE · NONE

SHEET 1 OF 1

DROP CONNECTIONS			
SIZE OF SEWER	TYPE A		TYPE B
	MIN. DROP	MAX. DROP	MIN. DROP
8"	1'-9"	3'-9"	3'-9"
10"	2'-0"	4'-0"	4'-0"
12"	2'-6"	6'-0"	6'-0"
15"	2'-6"	6'-0"	6'-0"



Notes:

1. PVC pipe shall be used for drop connection.
2. For 15" Sewers with drop connections use Special "Y" with 12" Branch.



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SANITARY-TYPE A
 DROP CONNECTION

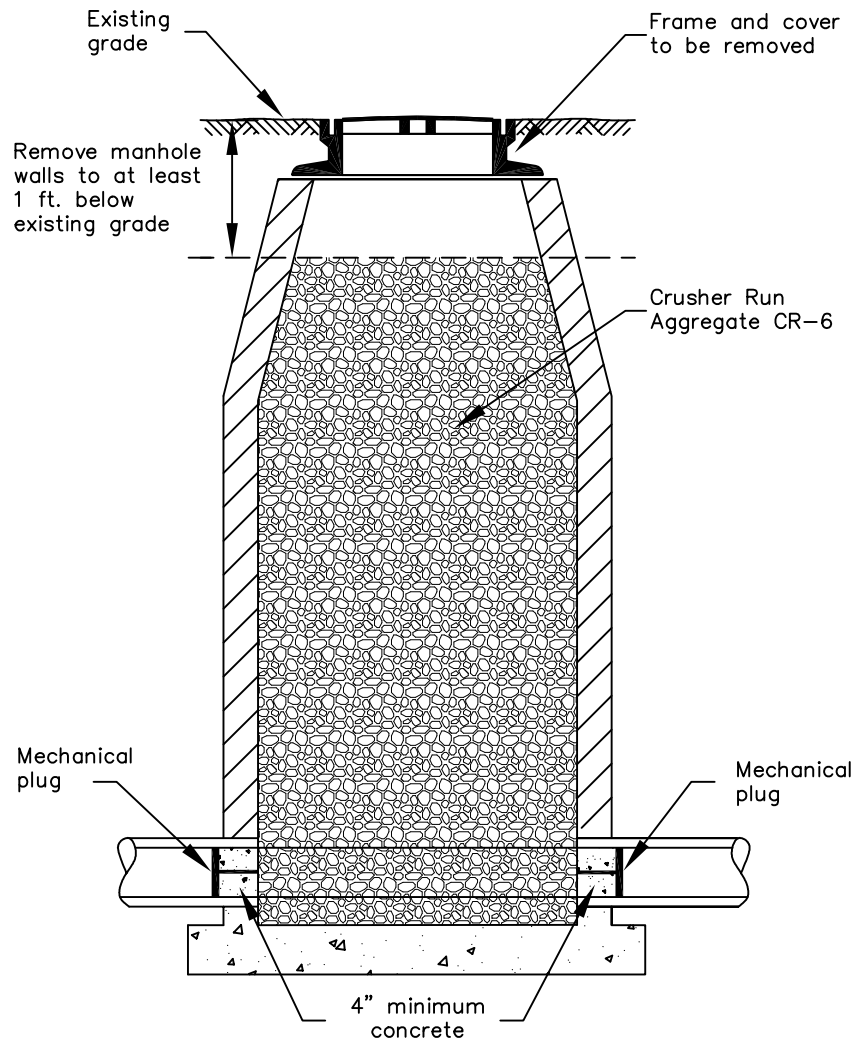
SANITARY-TYPE B
 DROP CONNECTION

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3 / 2008		

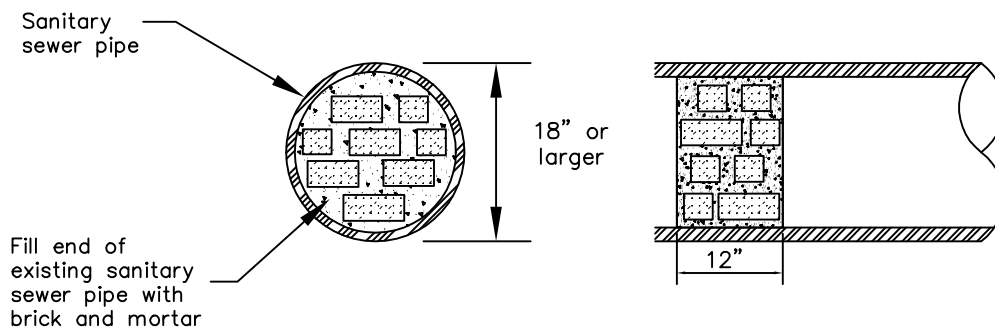
STANDARD NO.
 BC 831.09

SCALE : NONE

SHEET 1 OF 1




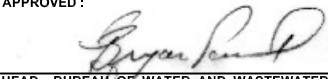
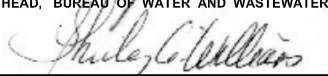
MANHOLE ABANDONMENT

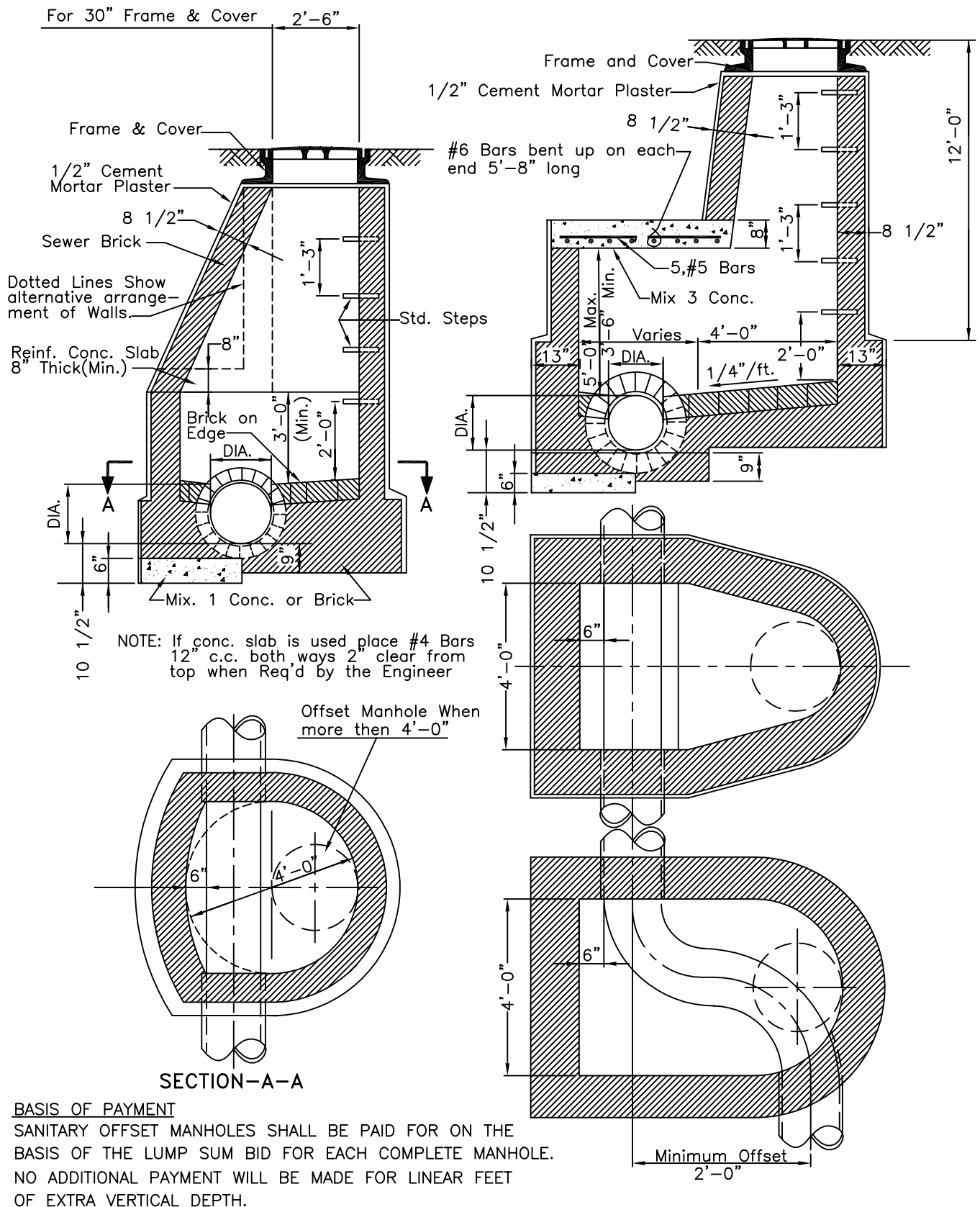


BRICK BULKHEAD

Notes:

1. Remove frame and cover, plug incoming and outgoing pipes, tear down manhole walls 1 ft. below existing grade and fill manhole with select backfill using Crusher Run Aggregate CR-6.
2. For sewers 15" and smaller use mechanical plugs for plugging pipe. For sewers 18" and larger a 12" thick masonry bulkhead may be substituted for mechanical plug.

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	MANHOLE ABANDONMENT		STANDARD NO. BC 831.10		
			SCALE : NONE	SHEET 1 OF 1	



BASIS OF PAYMENT

SANITARY OFFSET MANHOLES SHALL BE PAID FOR ON THE BASIS OF THE LUMP SUM BID FOR EACH COMPLETE MANHOLE. NO ADDITIONAL PAYMENT WILL BE MADE FOR LINEAR FEET OF EXTRA VERTICAL DEPTH.



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SANITARY OFFSET MANHOLE
30" COVER

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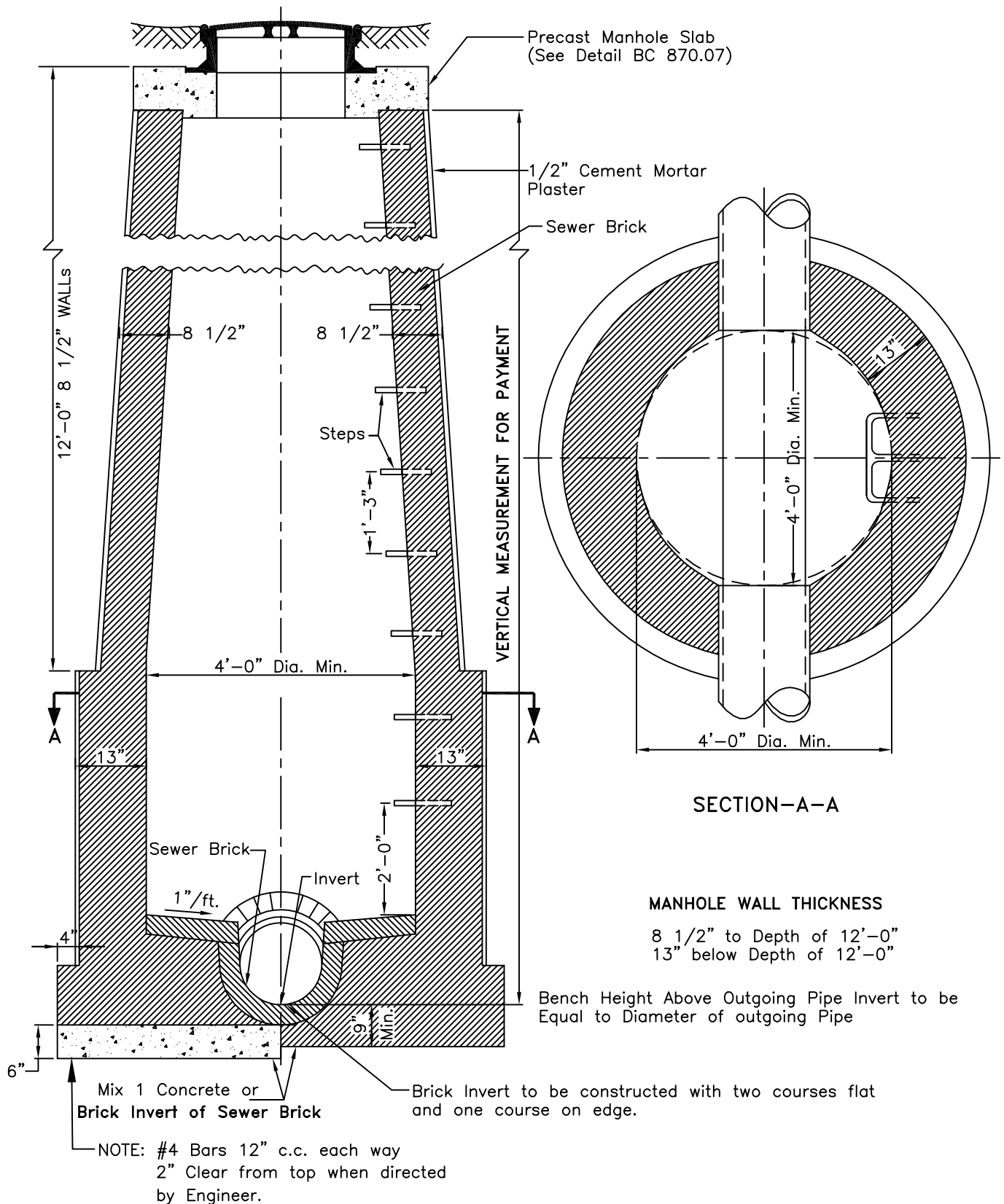
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STANDARD NO.
BC 831.20

SCALE: NONE

SHEET 1 OF 1



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STANDARD SANITARY
MANHOLE PRECAST SLAB

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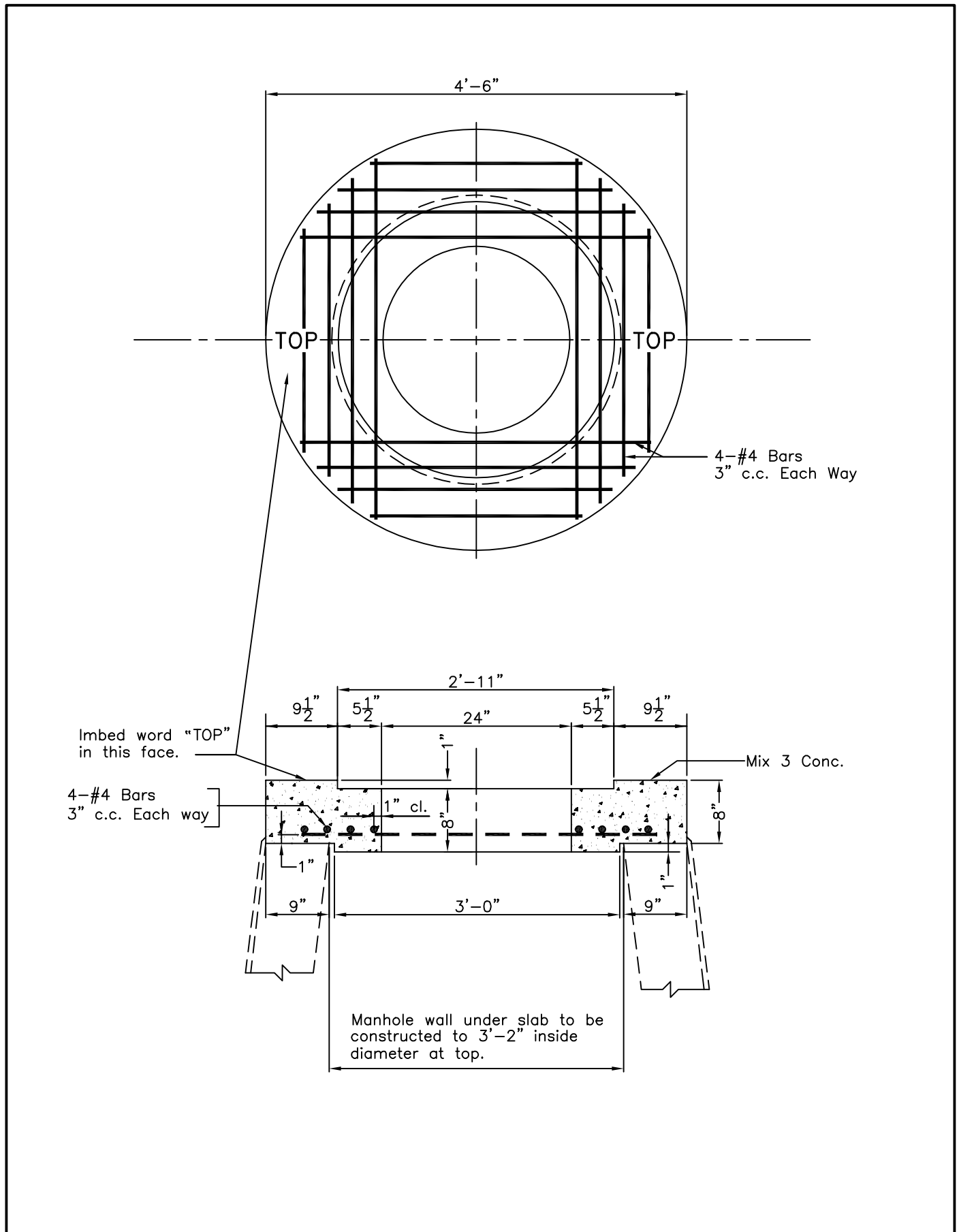
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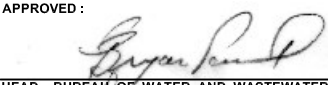
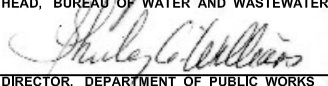
3 / 2008

STANDARD NO.
BC 831.21

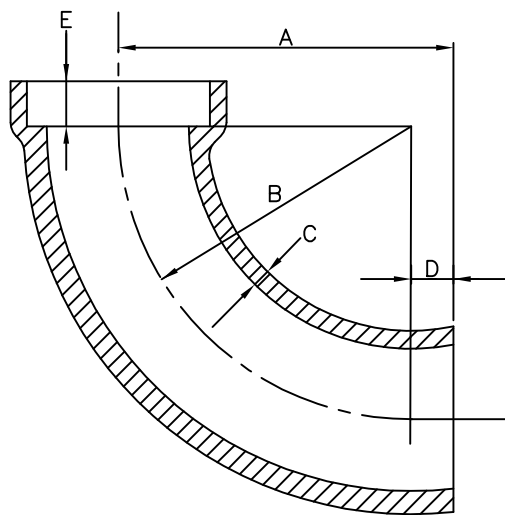
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SHEET 1 OF 1

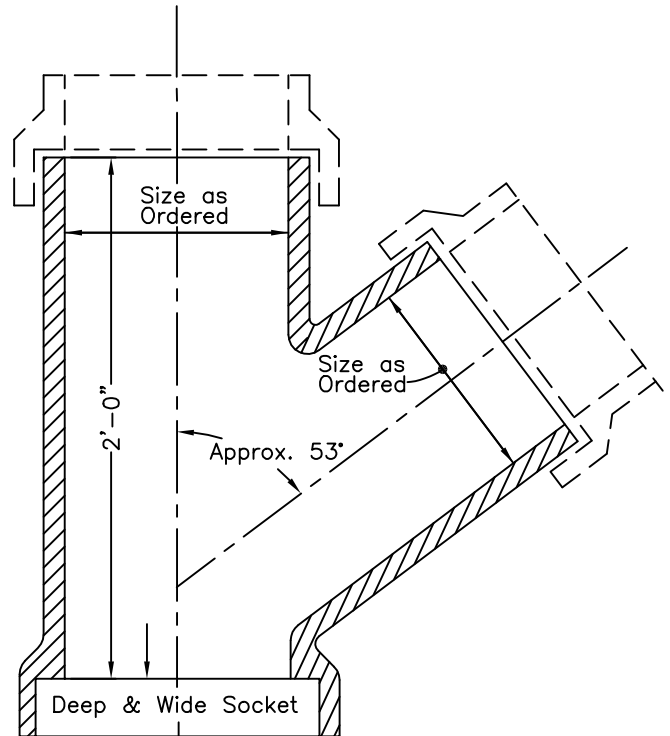


	APPROVED :	<p align="center">CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER</p> <p align="center">PRECAST MANHOLE SLAB FOR 24" FRAME</p>	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 831.22		
			SCALE : NONE	SHEET 1 OF 1	

SIZE	A	B	C	D	E
10"	23"	20"	7/8"	3"	2-3/4"
8"	21"	18"	3/4"	3"	2-3/4"
6"	18"	15"	5/8"	3"	2-1/2"



QUARTER BEND

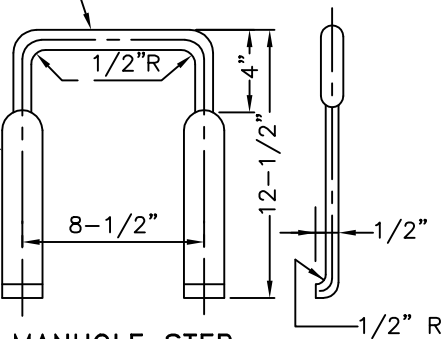


SPECIAL "Y" BRANCH

3/4" Round Galvanized
Wrought Iron

Flatten to 1/2"

Note: Wrought Iron Bar Shall Meet
the Requirement of A.S.T.M.
Spec. A 207-66 or Latest
Revision Thereof



MANHOLE STEP



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SPECIAL FITTINGS

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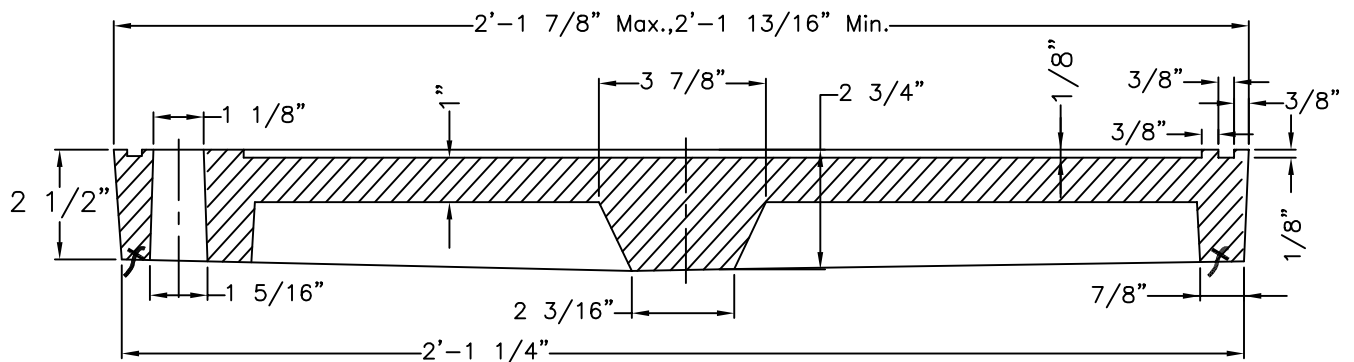
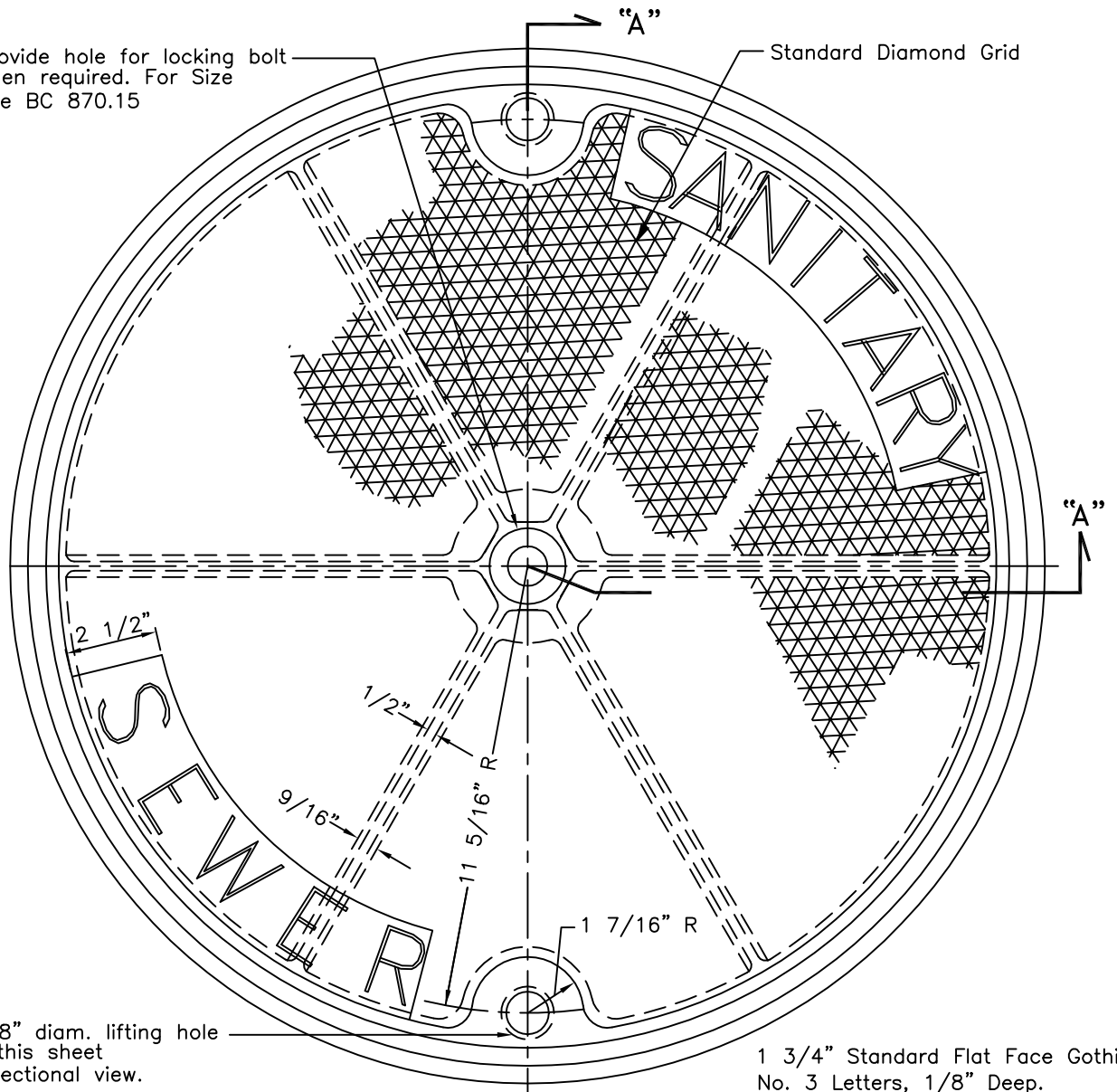
3 / 2008

STANDARD NO.
BC 831.23

SCALE : NONE

SHEET 1 OF 1

Provide hole for locking bolt
when required. For Size
See BC 870.15



For Std. 24" Manhole Frame
See BC 831.25

SECTION "A-A"



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

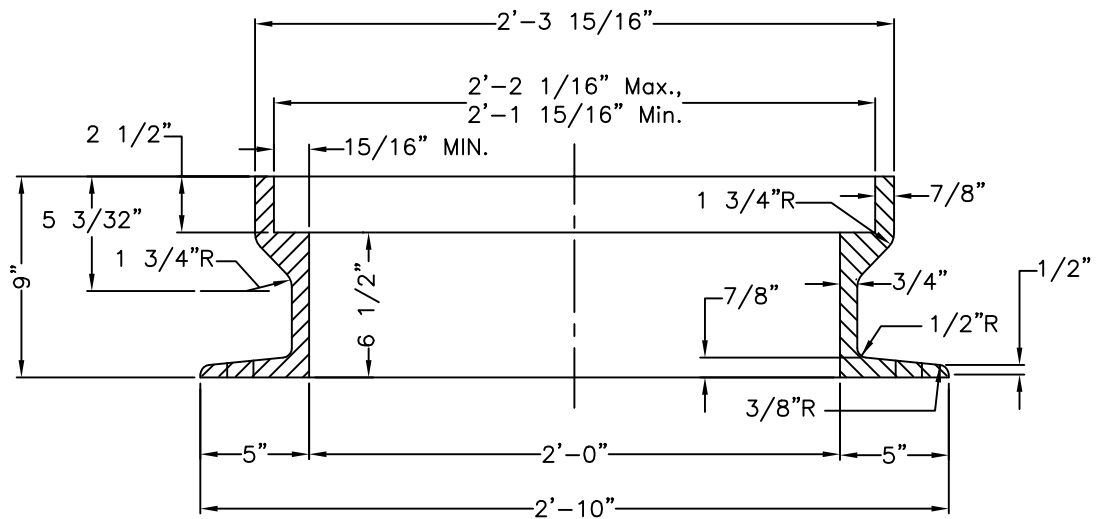
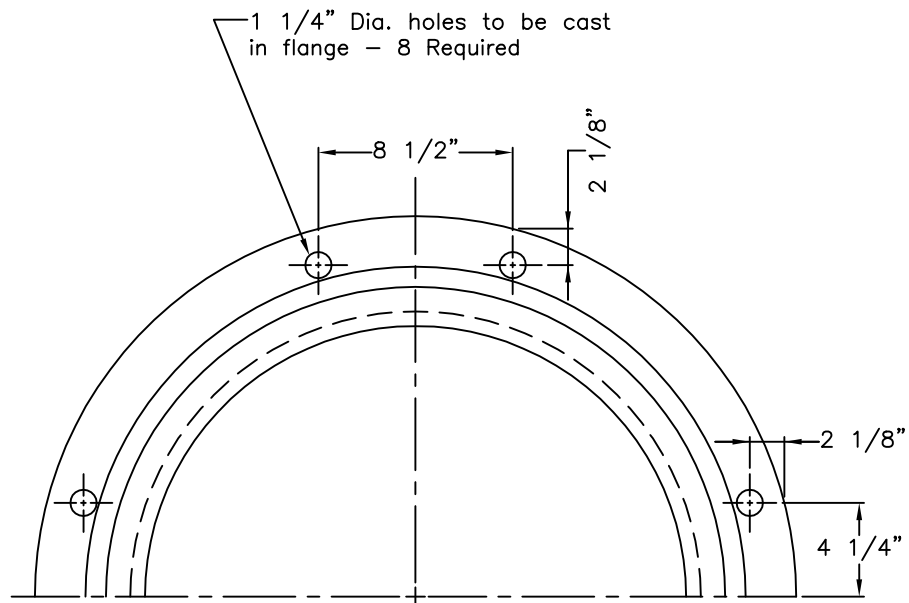
STANDARD SAN 24 IN.
MANHOLE COVER

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 831.24

SCALE: NONE

SHEET 1 OF 1



For 24" Lock Type Frame
See BC 831.28

For Std. 24" Manhole Cover
See BC 831.24



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STANDARD 24 IN.
MANHOLE FRAME

ISSUED

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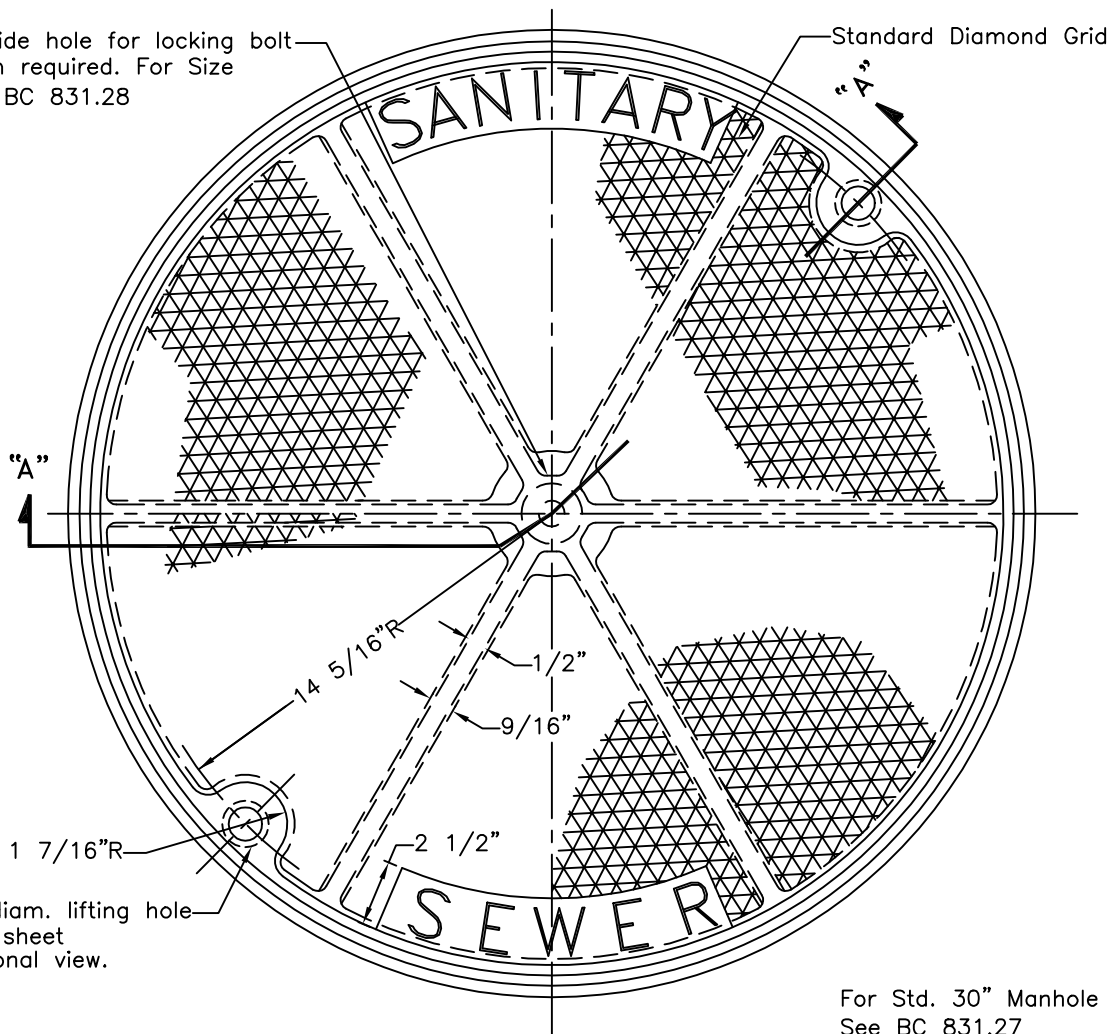
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STANDARD NO.
BC 831.25

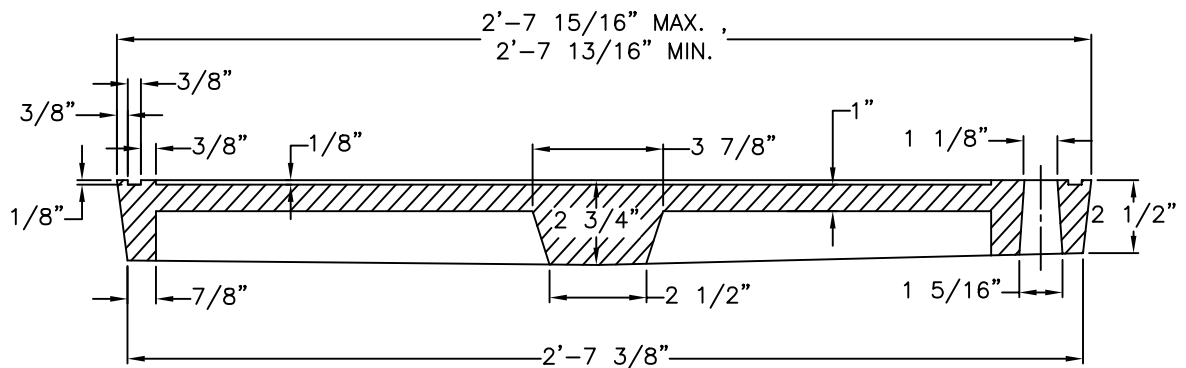
SCALE : NONE

SHEET 1 OF 1

Provide hole for locking bolt
when required. For Size
See BC 831.28



For Std. 30" Manhole Frame
See BC 831.27



1 3/4" Standard Flat Face Gothic
No. 3 Letters, 1/8" Deep.

SECTION "A-A"



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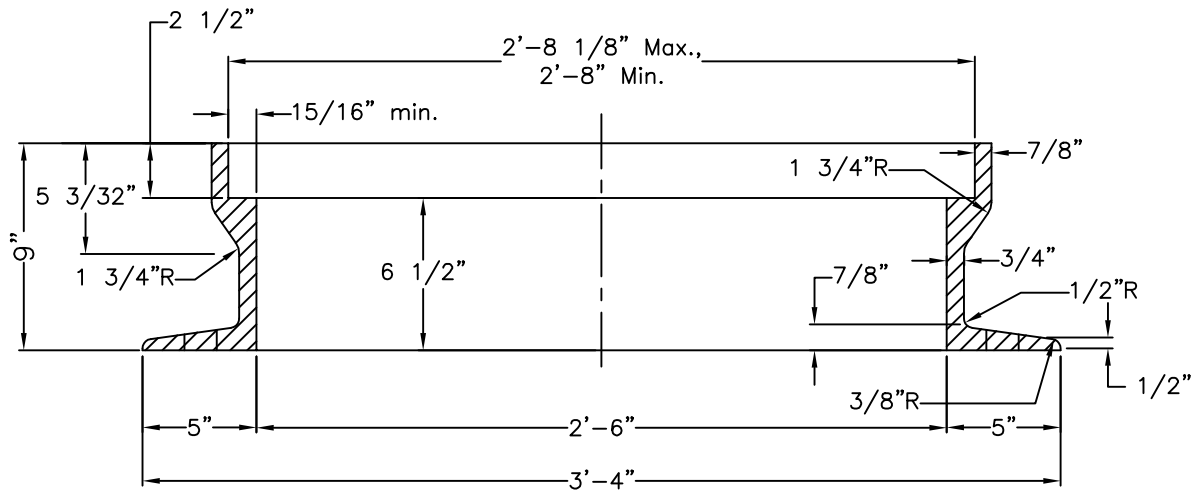
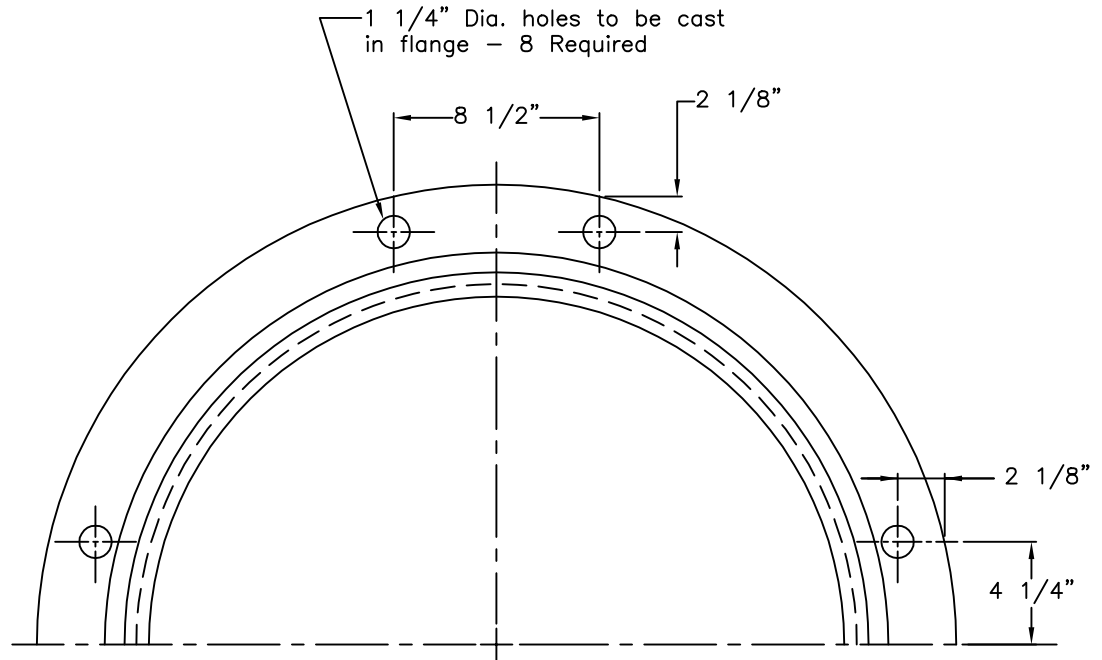
STANDARD SANITARY 30 IN.
MANHOLE COVER

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3 / 2008		

STANDARD NO.
BC 831.26

SCALE : NONE

SHEET 1 OF 1



For 30" Lock Type Frame
See BC 831.28
For Std. 30" Manhole Cover
See BC 831.26



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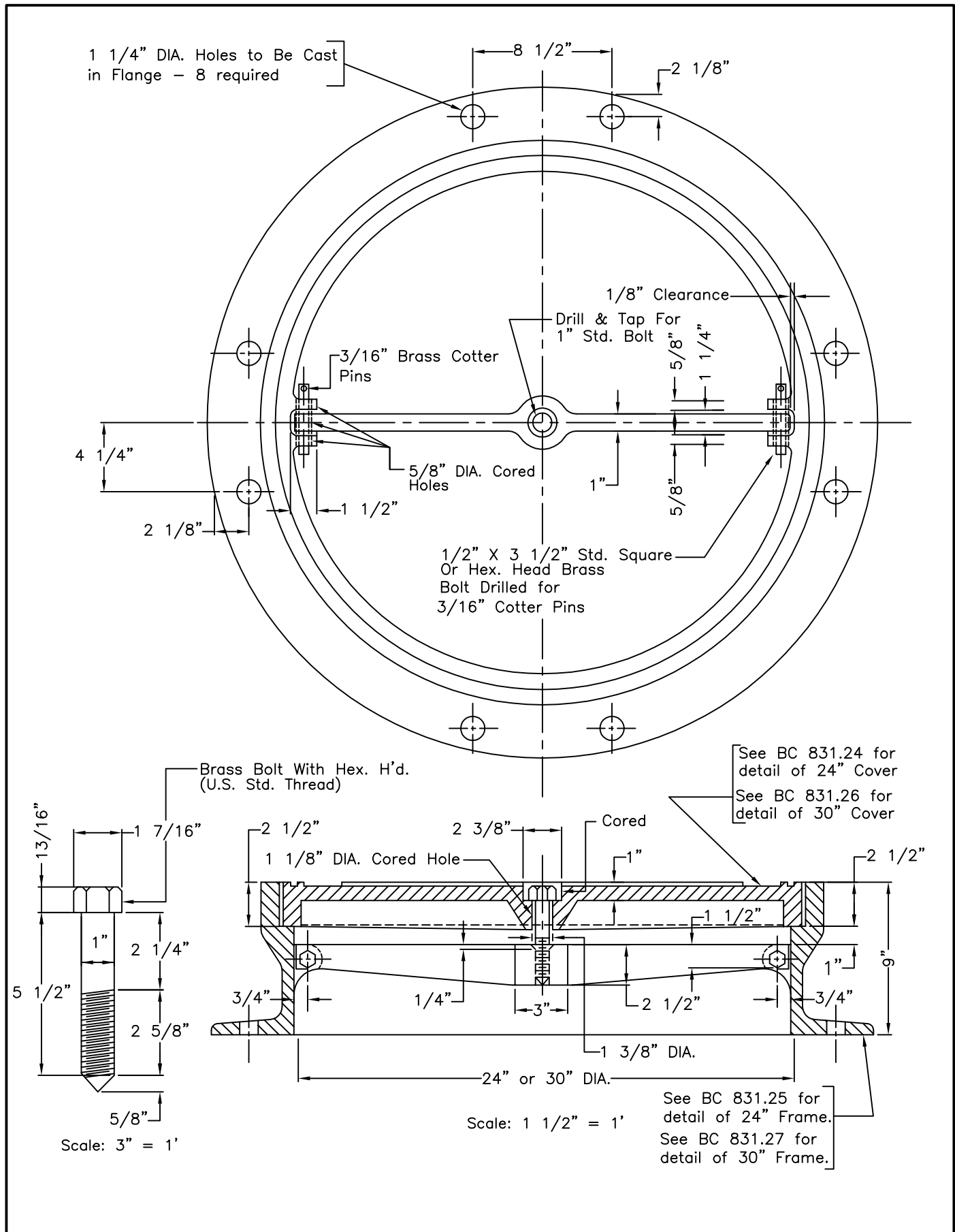
STANDARD 30 IN.
MANHOLE FRAME




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3 / 2008		

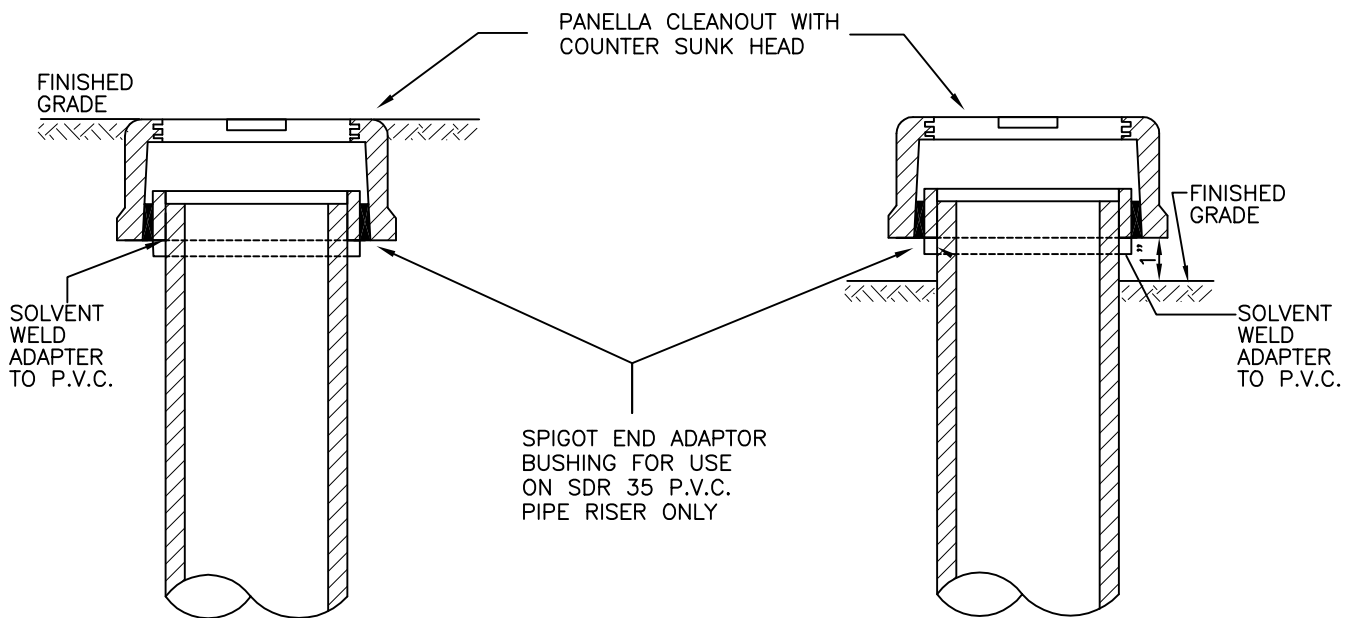
STANDARD NO.
BC 831.27

SCALE : NONE

SHEET 1 OF 1

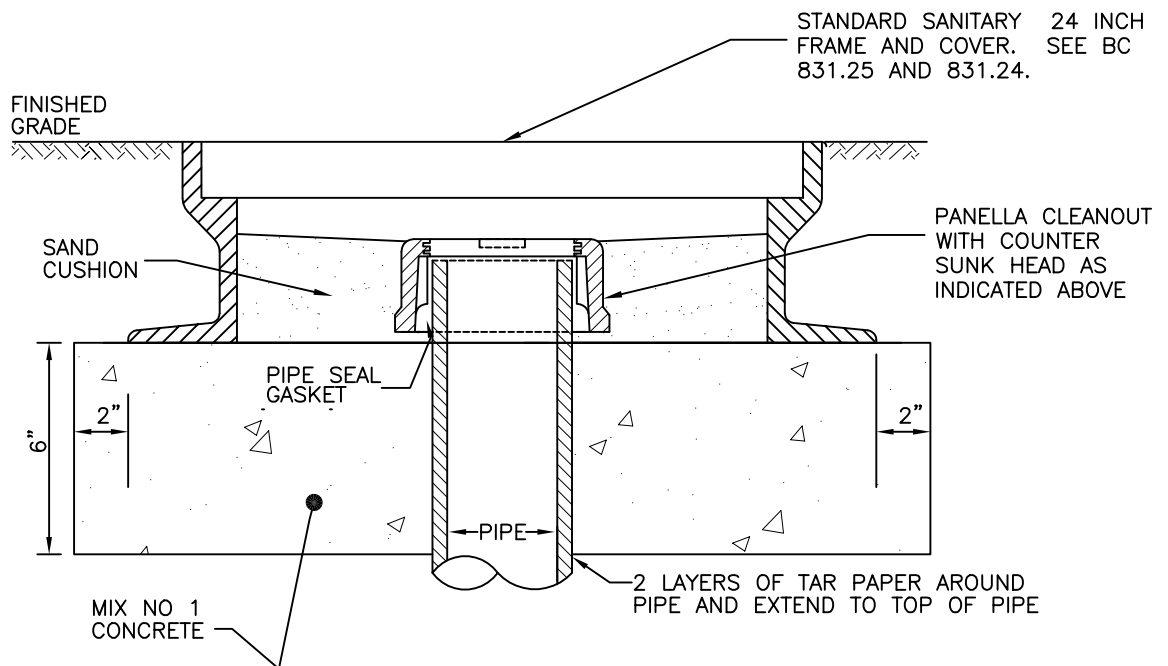


	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	HEAD, BUREAU OF WATER AND WASTEWATER	LOCKING DEVICE FOR MANHOLE FRAME & COVER	STANDARD NO. BC 831.28		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		SCALE : NONE		SHEET 1 OF 1



DETAIL FOR SIDEWALK
AREA ONLY

DETAIL FOR NON-TRAFFIC
AREA ONLY



DETAIL FOR ROADWAY
AREA ONLY



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[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

CLEANOUT COVER
ASSEMBLY

ISSUED

REVISED

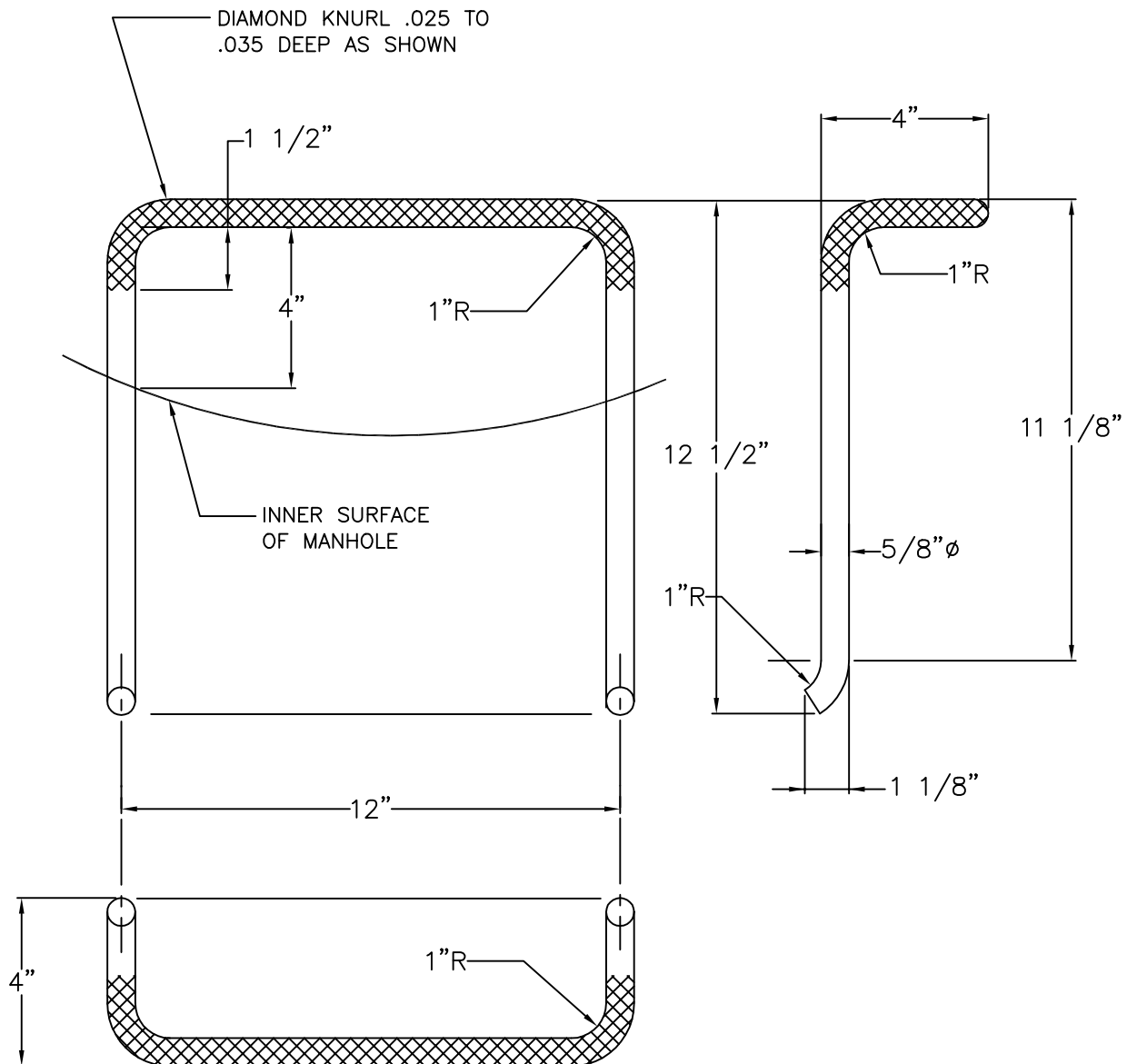
REVISED

3 / 2008

STANDARD NO.
BC 831.29

SCALE : NONE

SHEET 1 OF 1



DROP FRONT
IN-LINE OR STAGGERED

NOTE:

1. KNURL BEFORE BENDING, MIN. KNURLING AS SHOWN.
2. STEPS TO BE TYPE 410 STAINLESS STEEL, MILL FINISH.



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DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

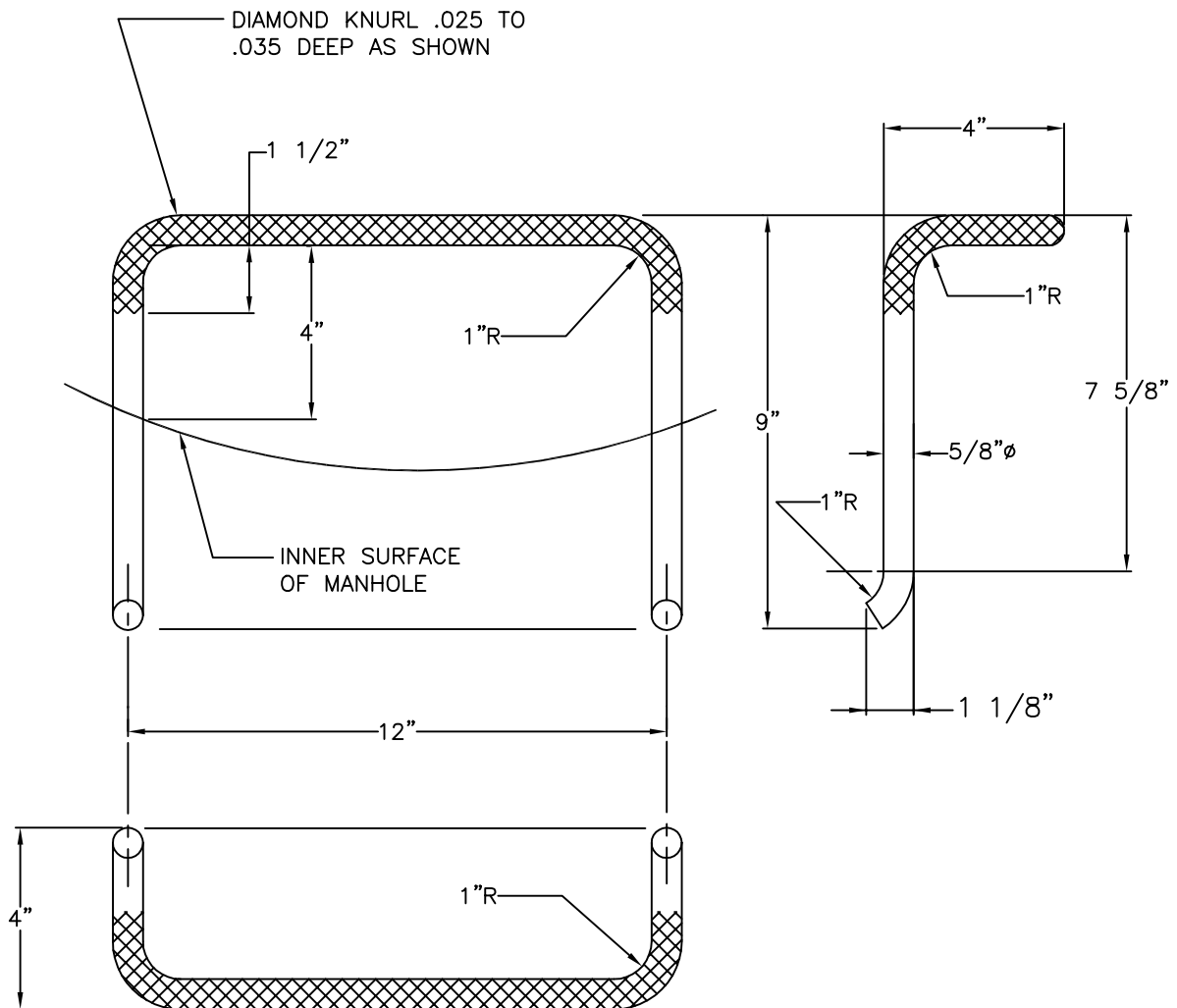
TYPE 1 STEP FOR
BRICK MANHOLES

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 831.30

SCALE : NONE

SHEET 1 OF 1



DROP FRONT
IN-LINE OR STAGGERED

NOTE:

1. KNURL BEFORE BENDING, MIN. KNURLING AS SHOWN.
2. STEPS TO BE TYPE 410 STAINLESS STEEL, MILL FINISH.



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HEAD, BUREAU OF WATER AND WASTEWATER
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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

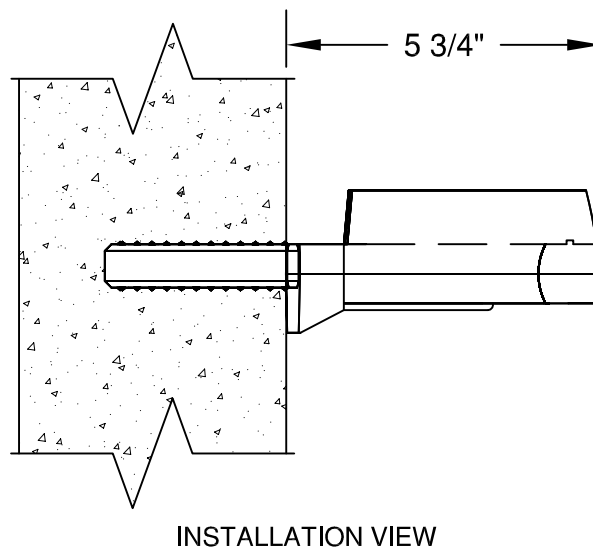
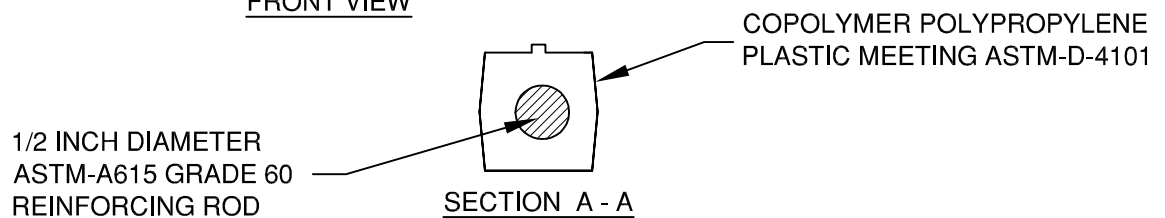
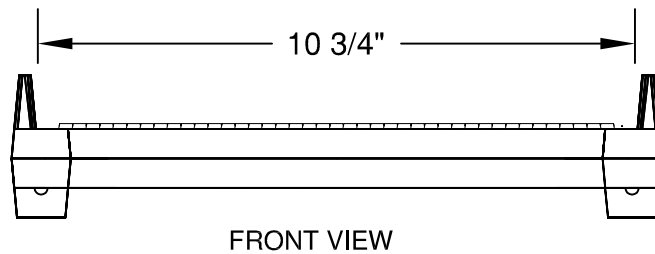
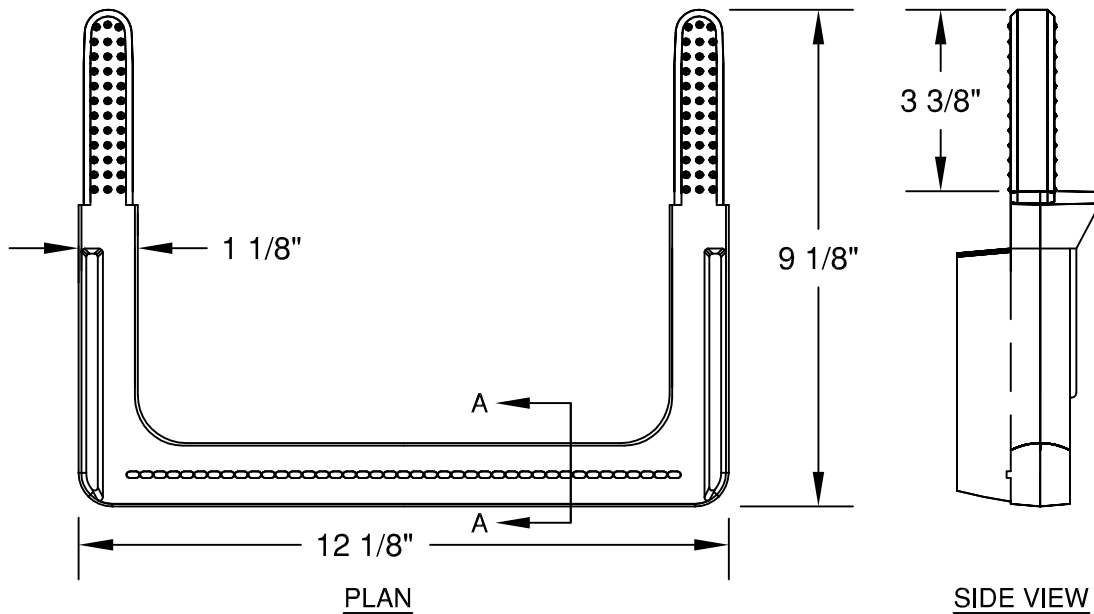
TYPE 2 STEP FOR PRECAST
& CAST IN PLACE MANHOLES

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 831.31

SCALE : NONE

SHEET 1 OF 1



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DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

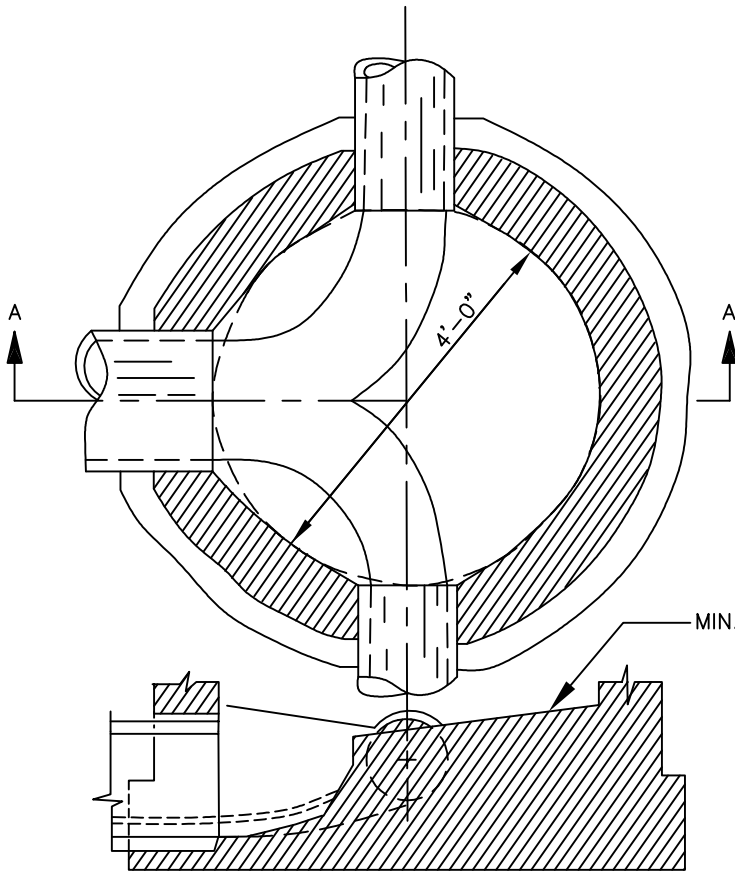
COPOLYMER POLYPROPYLENE
STEPS FOR PRECAST AND CAST IN
PLACE MANHOLES

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 831.32

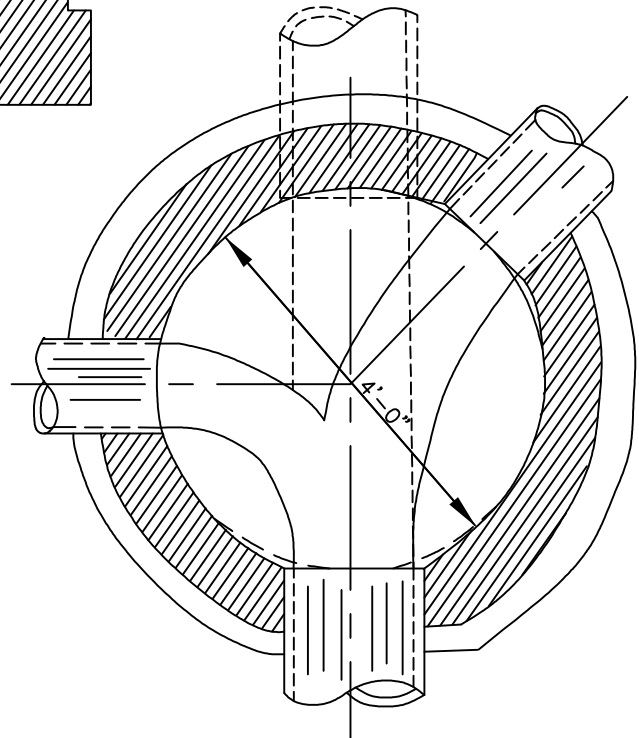
SCALE : NONE

SHEET 1 OF 1



BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE

SECTION A-A
STANDARD CHANNEL NO. 1



STANDARD CHANNEL NO. 2



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPICAL MANHOLE CHANNELS

STANDARD CHANNEL NO. 1
STANDARD CHANNEL NO. 2

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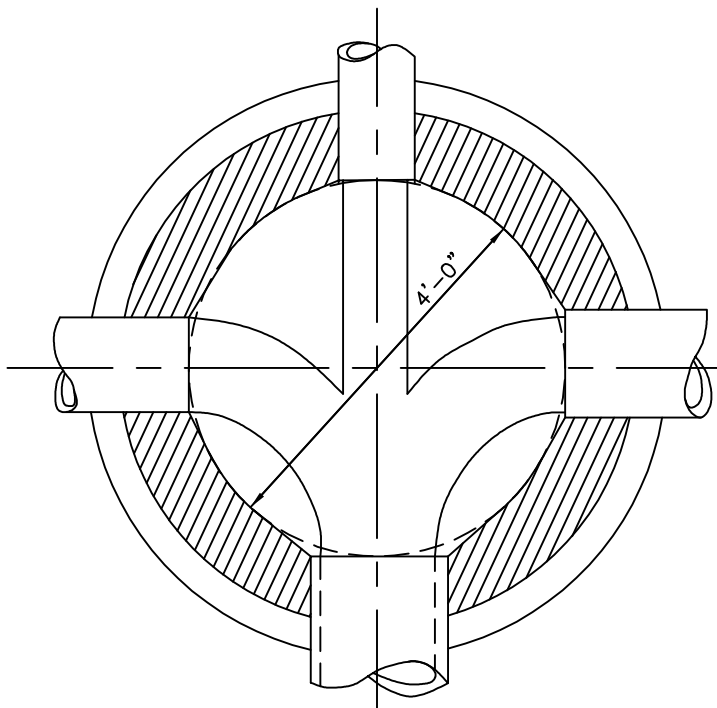
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3 / 2008

STANDARD NO.
BC 831.35

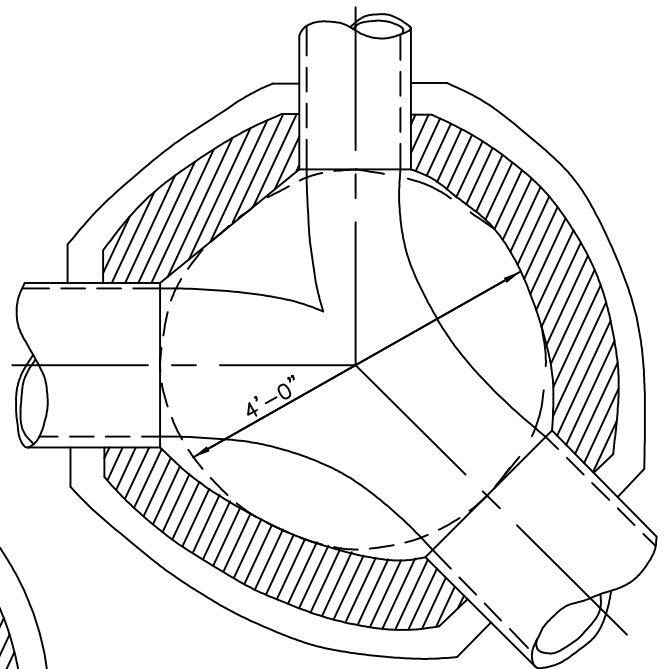
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SHEET 1 OF 1

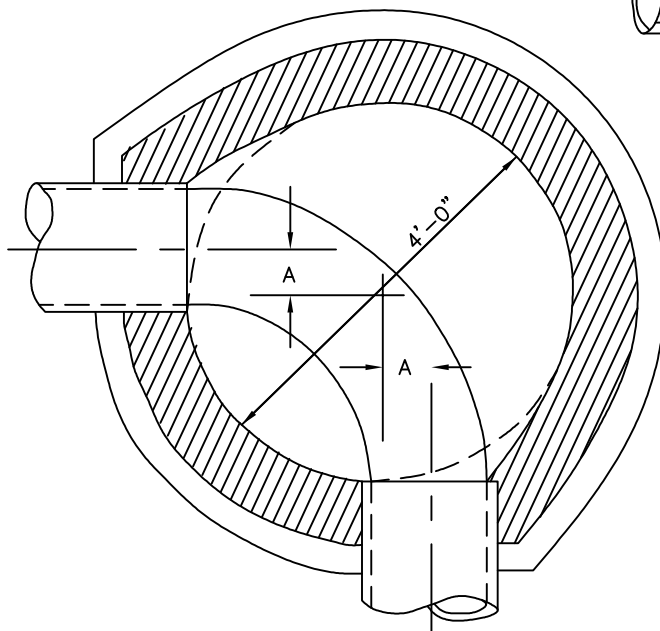


BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE

STANDARD CHANNEL NO.3



STANDARD CHANNEL NO. 4



STANDARD CHANNEL NO. 5
(FOR 8",10", 12" AND 15" PIPE SEWERS)

NOTE:
A = 3" FOR 8" AND 10" PIPE SEWERS
A = 6" FOR 12" AND 15" PIPE SEWERS



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPICAL MANHOLE CHANNELS
STANDARD CHANNEL NO. 3
STANDARD CHANNEL NO. 4
STANDARD CHANNEL NO. 5

ISSUED

REVISED

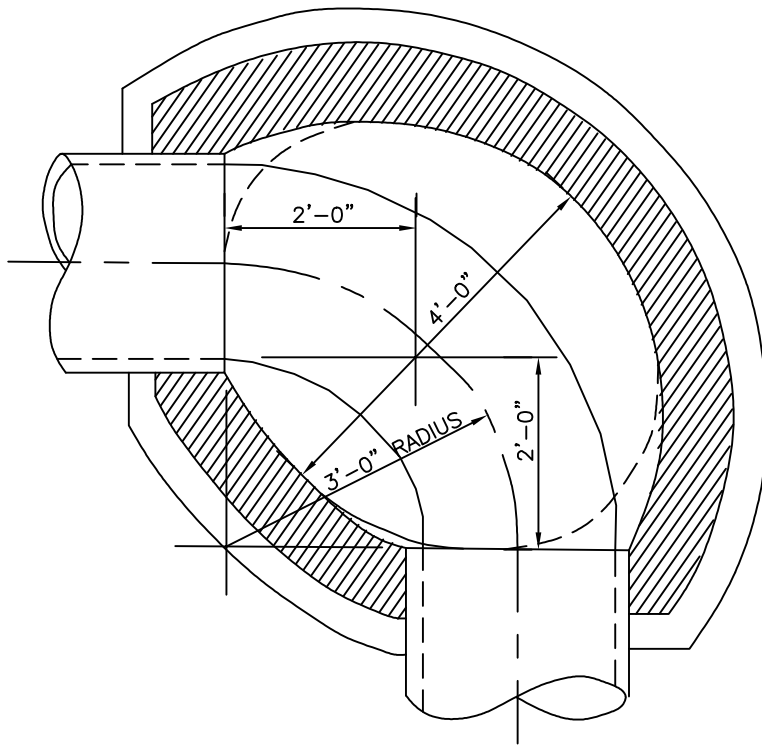
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3 / 2008

STANDARD NO.
BC 831.36

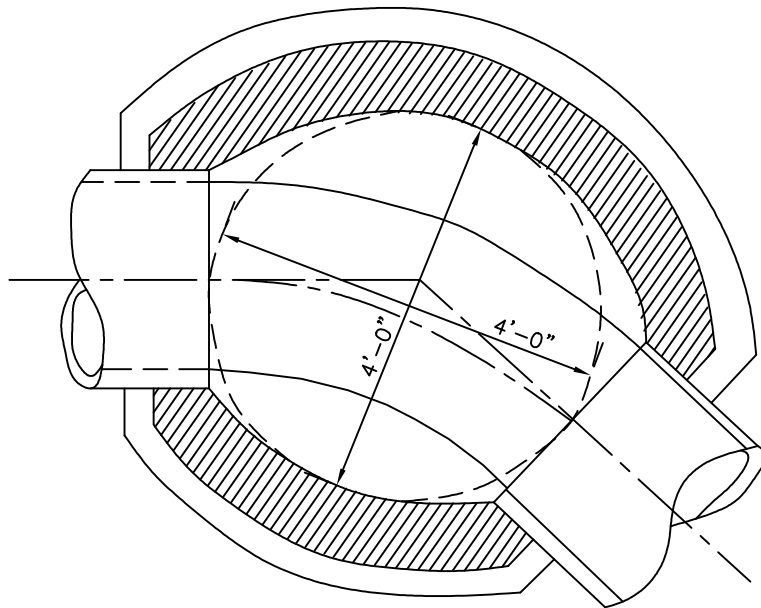
SCALE : NONE

SHEET 1 OF 1


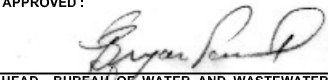
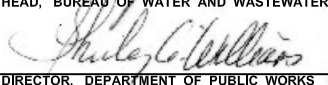


BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE

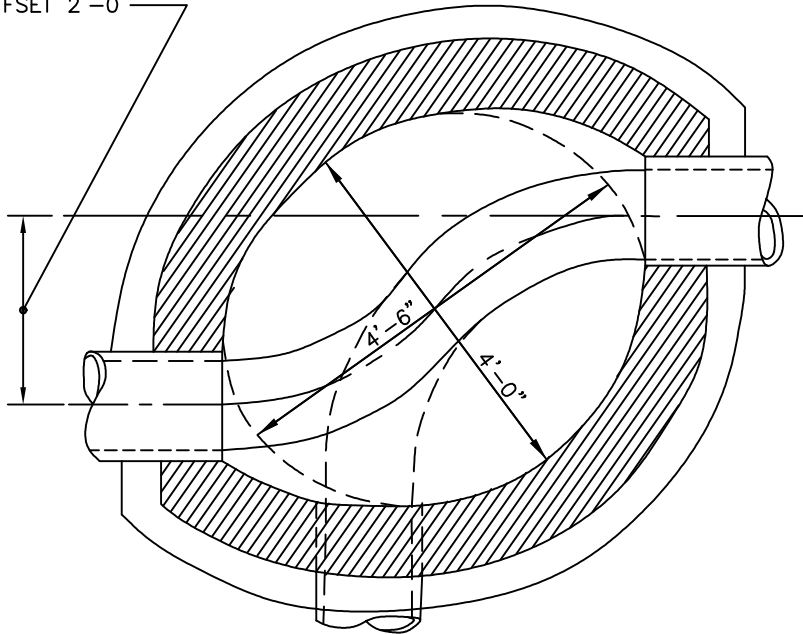
STANDARD CHANNEL NO. 6
(FOR 18", 21" AND 24" PIPE SEWERS)



STANDARD CHANNEL NO. 7

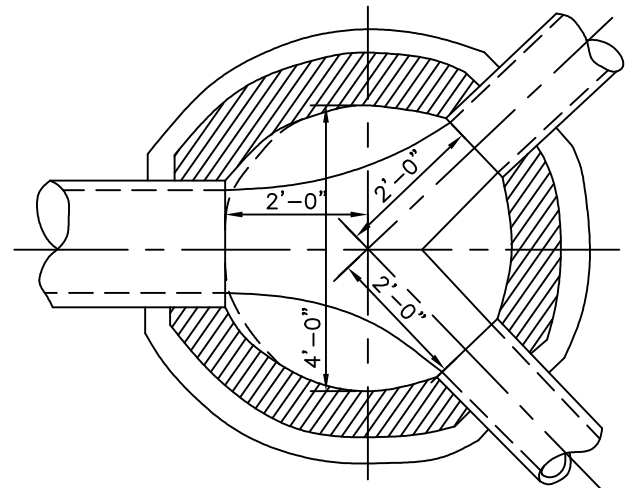
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	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 831.37		
			SCALE : NONE	SHEET 1 OF 1	

MAXIMUM
OFFSET 2'-0"

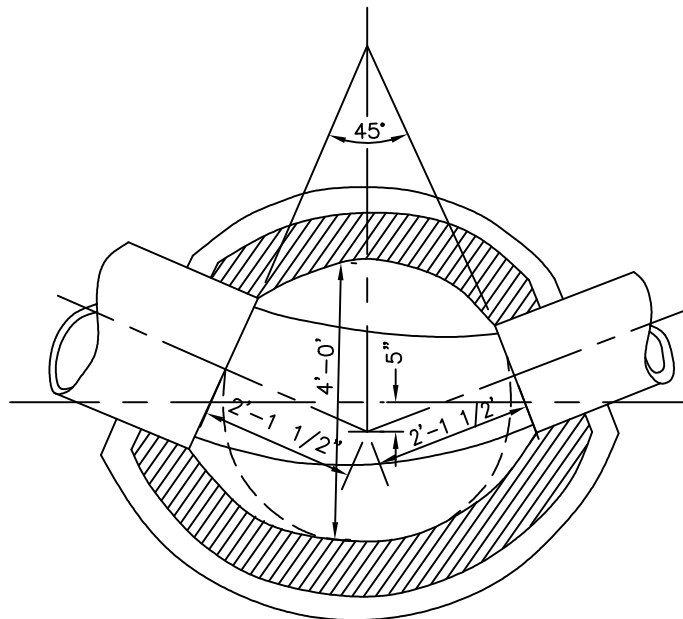


STANDARD CHANNEL NO. 8

BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE



STANDARD CHANNEL NO. 9



STANDARD CHANNEL NO.10



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DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

TYPICAL MANHOLE CHANNELS
STANDARD CHANNEL NO. 8
STANDARD CHANNEL NO. 9
STANDARD CHANNEL NO. 10

ISSUED

REVISED

REVISED

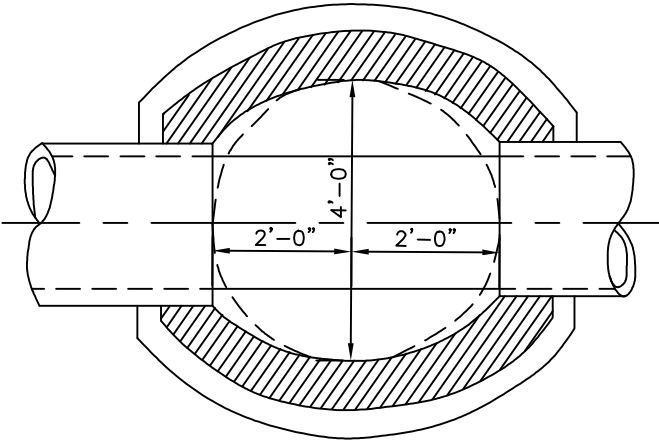
3 / 2008

STANDARD NO.
BC 831.38

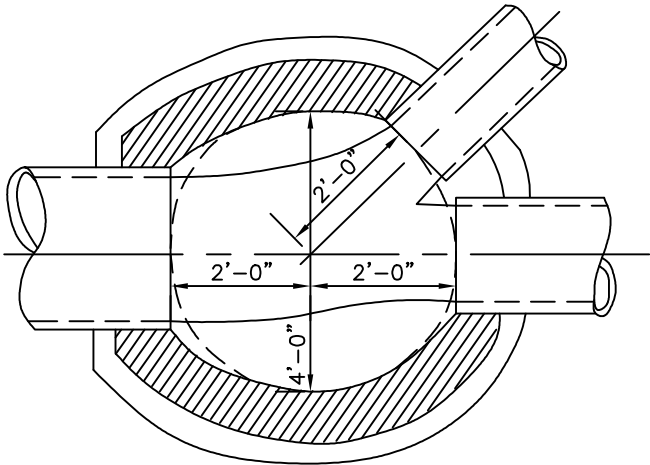
SCALE : NONE

SHEET 1 OF 1


BENCH HEIGHT ABOVE OUTGOING PIPE
INVERT TO BE EQUAL TO DIAMETER OF
OUTGOING PIPE

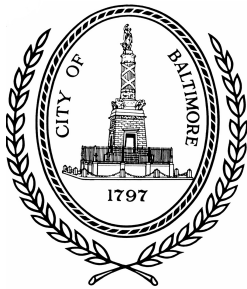


STANDARD CHANNEL NO. 11



STANDARD CHANNEL NO. 12

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER TYPICAL MANHOLE CHANNELS STANDARD CHANNEL NO. 11 STANDARD CHANNEL NO. 12	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 831.39		
			SCALE : NONE		SHEET 1 OF 1



Standard Water Details

March 2008

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
WATER INDEX OF DRAWINGS**

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**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
WATER CROSS INDEX OF DRAWINGS**

WATER DETAILS:

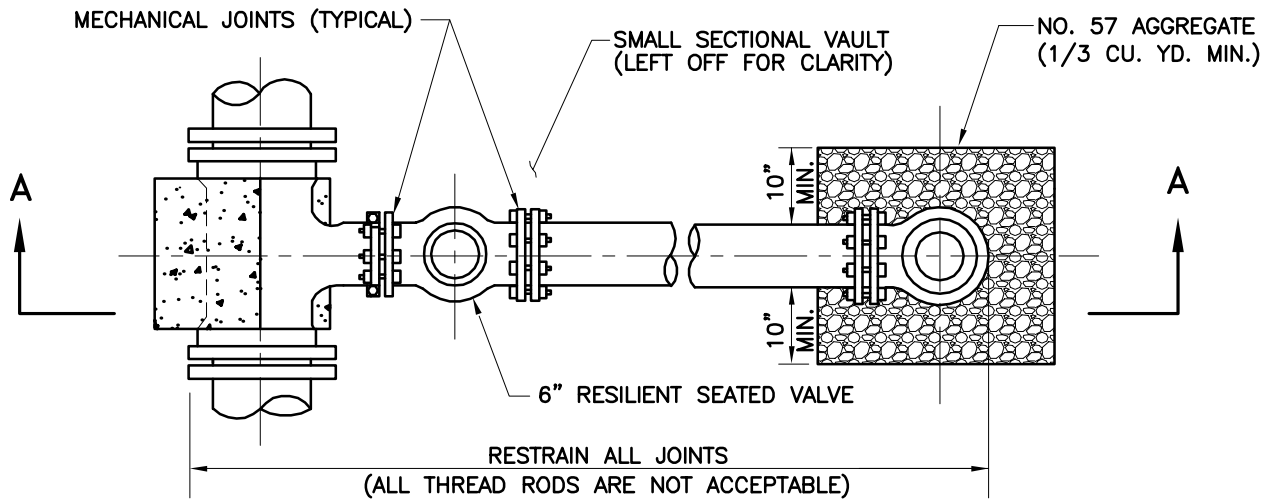
Old Dwg. No.	Dwg. No.	Description	Pages
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BC 835.01	BC 833.02	Standard Installation of Fire Hydrant with Tee and Valve (Roadway Box)	1 of 1
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BC 836.21	BC 834.04	Standard Installation of Tapping Valve with Large Sectional Vault (10" - 12")	1 of 1
	BC 834.05	Standard Installation of Tapping Valve with Roadway Box (10" - 12")	1 of 1
	BC 834.06	Standard Installation of Tapping Sleeve and Horizontal Valve with Sectional Vault (4" - 24")	1 of 1
	BC 834.07	Standard Installation of Tapping Sleeve and Horizontal Valve with Roadway Box (4" - 14")	1 of 1
	BC 835.01	Standard Installation of Butterfly Valve with Sectional Vault (30" - 72")	1 of 1
	BC 835.02	Standard Installation of Butterfly Valve with Roadway Box (30" - 72")	1 of 1
	BC 835.03	Standard Butterfly Valve Over Torque Protector	1 of 1
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BC 840.03	BC 838.01	Standard Installation of Twin Water Supply Services (5/8" Meters)	1 of 1
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BC 840.06	BC 840.01	Standard Installation of 2" Water Supply Service (1 1/2" Meter) for 8" Main and Larger	1 of 1
BC 840.07	BC 840.02	Standard Installation of 2" Water Supply Service (1 1/2" Meter) for 6" Main and Smaller	1 of 1
BC 840.08	BC 840.03	Standard Installation of 2" Water Supply Service (2" Meter) for 8" Main and Larger	1 of 2
BC 840.09	BC 840.03	Standard Installation of 2" Water Supply Service (2" Meter) for 8" Main and Larger	2 of 2
	BC 841.01	Standard Installation for Fire Protection 1 1/2" Water Supply Service (3/4" Meter) for 4" Main	1 of 1
	BC 841.02	Standard Installation for Fire Protection 1 1/2" Water Supply Service (1" Meter) for 4" Main	1 of 1
	BC 841.03	Standard Installation for Fire Protection 1 1/2" Twin Water Supply Services (3/4" Meters) for 4" Main	1 of 1
	BC 841.04	Standard Installation for Fire Protection 1 1/2" Twin Water Supply Services (1" Meters) for 4" Main	1 of 1
	BC 841.05	Standard Installation for Fire Protection 1 1/2" Water Supply Service (3/4" Meter) for 6" Main and Larger	1 of 1
	BC 841.06	Standard Installation for Fire Protection 1 1/2" Water Supply Service (1" Meter) for 6" Main and Larger	1 of 1
	BC 841.07	Standard Installation for Fire Protection 1 1/2" Twin Water Supply Services (3/4" Meters) for 6" Main and Larger	1 of 1
	BC 841.08	Standard Installation for Fire Protection 1 1/2" Twin Water Supply Services (1" Meters) for 6" Main and Larger	1 of 1
BC 840.10 1 OF 3	BC 842.01	Standard Installation of 4" & 6" Water Supply Services (4" & 6" Meters)	1 of 1
BC 840.10 2 OF 3	BC 842.02	Standard Installation of 4" & 6" Water Supply Services (3" & 4" Meters with Reducers)	1 of 1
BC 840.10 3 OF 3	BC 842.03	Standard Vault for 4" & 6" Water Supply Services	1 of 1
	BC 843.01	Standard Installation of 4" & 6" Water Supply Services (3", 4", & 6" Meters) with Tee and Valve (Roadway Box)	1 of 1
	BC 843.02	Standard Installation of 4" & 6" Water Supply Services (3", 4", & 6" Meters) with Tee and Valve (Sectional Vault)	1 of 1
	BC 843.03	Standard Installation of 4" & 6" Water Supply Services (3", 4", & 6" Meters) with Tapping Sleeve and Valve (Sectional Vault)	1 of 1
BC 840.14 1 OF 2	BC 844.01	Standard Vault for 4", 6", 8", & 10" Detector Checks with Large Domestic Meters	1 of 3
BC 840.14 1 OF 2	BC 844.01	Rebar Schedule for Standard Vault for 4", 6", 8", & 10" Detector Checks with Large Domestic Meters	2 of 3

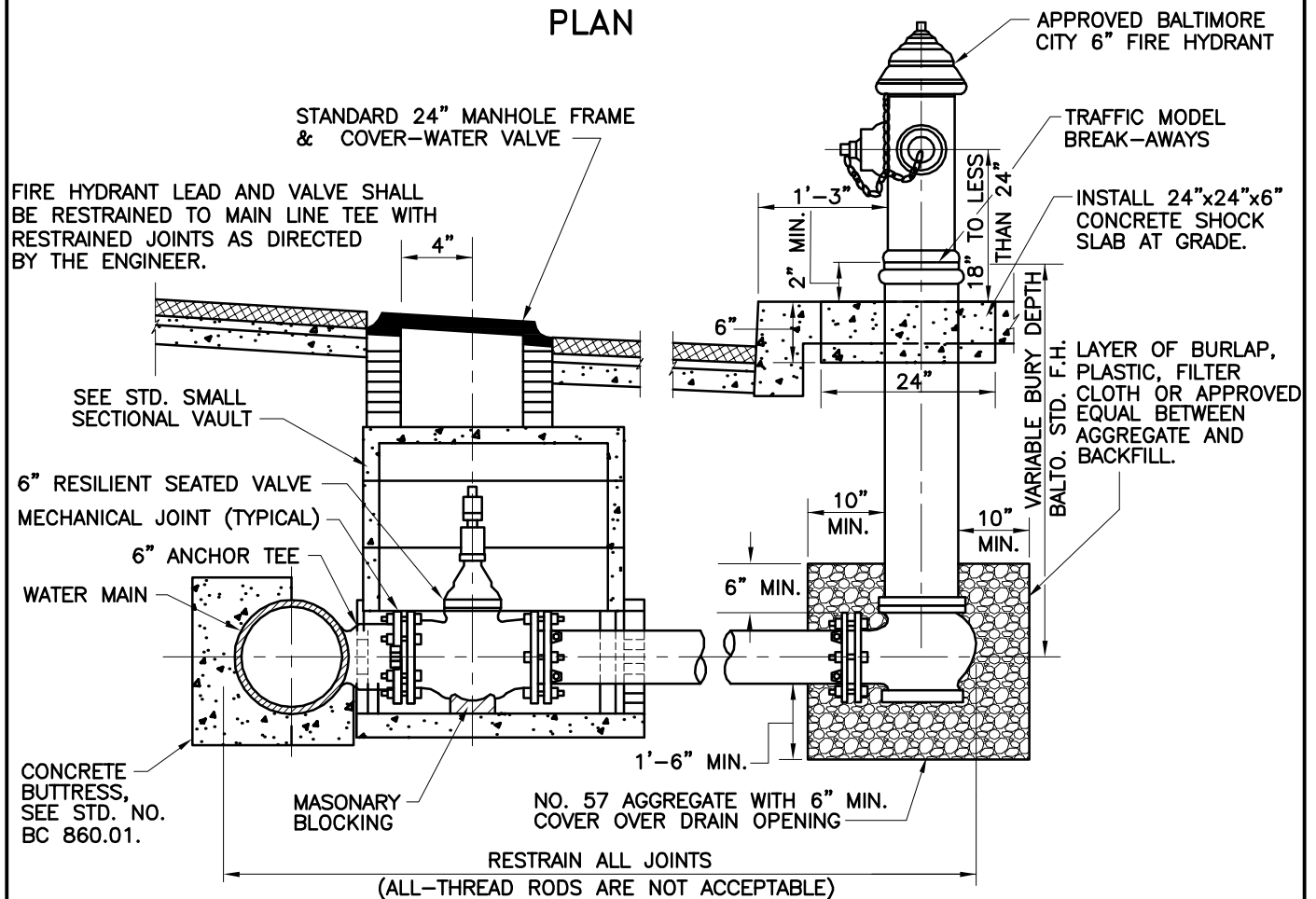
BC 840.14 2 OF 2	BC 844.01	Roof Slab and Concrete Quantities for Standard Vault for 4", 6", 8", & 10" Detector Checks with Large Domestic Meters	3 of 3
BC 840.15 1 OF 2	BC 845.01	Standard Vault for 4", 6", 8", & 10" Detector Checks with Reduced Size Large Domestic Meters	1 of 3
BC 840.15 1 OF 2	BC 845.01	Rebar Schedule for Standard Vault for 4", 6", 8", & 10" Detector Checks with Reduced Size Large Domestic Meters	2 of 3
BC 840.15 2 OF 2	BC 845.01	Roof Slab and Concrete Quantities for Standard Vault for 4", 6", 8", & 10" Detector Checks with Reduced Size Large Domestic Meters	3 of 3
BC 840.16 1 OF 2	BC 846.01	Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Small Domestic Meters	1 of 2
BC 840.16 2 OF 2	BC 846.01	Roof Slab and Concrete Quantities for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Small Domestic Meters	2 of 2
BC 840.17 1 OF 2	BC 847.01	Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters	1 of 3
BC 840.17 1 OF 2	BC 847.01	Rebar Schedule for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters	2 of 3
BC 840.17 2 OF 2	BC 847.01	Roof Slab and Concrete Quantities for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters	3 of 3
BC 840.18 1 OF 2	BC 848.01	Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Large Domestic Meters	1 of 3
BC 840.18 1 OF 2	BC 848.01	Rebar Schedule for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Large Domestic Meters	2 of 3
BC 840.18 2 OF 2	BC 848.01	Roof Slab and Concrete Quantities for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Large Domestic Meters	3 of 3
BC 840.19 1 OF 2	BC 849.01	Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Reduced Size Large Domestic Meters	1 of 3
BC 840.19 1 OF 2	BC 849.01	Rebar Schedule for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Reduced Size Large Domestic Meters	2 of 3
BC 840.19 2 OF 2	BC 849.01	Roof Slab and Concrete Quantities for Standard Vault for 4", 6", 8", 10", & 12" F. M. Meters with Reduced Size Large Domestic Meters	3 of 3
BC 840.90	BC 850.01	Standard Installation of 4", 6", 8", 10", & 12" Fire Supply Services with Water Supply Service (Outside Fire Hydrants) with Tee and Valve (Sectional Vault)	1 of 1
BC 840.90	BC 850.02	Standard Installation of 4", 6", 8", 10", & 12" Fire Supply Services with Water Supply Service (Outside Fire Hydrants) with Tapping Sleeve and Valve (Sectional Vault)	1 of 1
BC 840.91	BC 851.01	Standard Installation of 4", 6", 8", & 10" Fire Supply Services with Water Supply Service (No Outside Fire Hydrants) with Tee and Valve (Sectional Vault)	1 of 1

BC 840.91	BC 851.02	Standard Installation of 4", 6", 8", & 10" Fire Supply Services with Water Supply Service (No Outside Fire Hydrants) with Tapping Sleeve and Valve (Sectional Vault)	1 of 1
BC 840.92	BC 852.01	Standard Installation for 4", 6", 8", 10", & 12" Water Supply Services (4", 6", 8", 10", & 12" Combined Services) with Tee and Valve (Sectional Vault)	1 of 1
BC 840.92	BC 852.02	Standard Installation for 4", 6", 8", 10", & 12" Water Supply Services (4", 6", 8", 10", & 12" Combined Services) with Tapping Sleeve and Valve (Sectional Vault)	1 of 1
BC 840.93	BC 853.01	Standard Water Meter Vaults	1 of 1
BC 890.34	BC 854.01	Standard Installation of Water Main on Structures (Steel Pipe Only)	1 of 1
BC 890.35	BC 854.02	Bolt Size Chart for Standard Installation of Water Main on Structures (Steel Pipe Only)	1 of 1
	BC 855.01	Water Main Relocation Under Proposed Utility	1 of 1
	BC 856.01	Standard Air Release Valve and Vault Precast and Cast in Place	1 of 1
BC 890.30	BC 857.01	Standard Installation for Blow	1 of 1
BC 890.31	BC 858.01	Standard Plug Clamps - 1	1 of 2
BC 890.32	BC 858.01	Standard Plug Clamps - 2	2 of 2
BC 890.33	BC 859.01	Standard Tie Bolt	1 of 1
BC 837.23	BC 860.01	Buttress for Tees (For 4" - 20")	1 of 1
BC 837.22	BC 861.01	Buttress for Caps (For 4" - 20")	1 of 1
BC 837.12	BC 862.01	Buttress for Horizontal Bends (For 4" - 20")	1 of 1
to			
BC 837.21			
	BC 863.01	Thrust Blocks for Reducers (For 8" x 4" to 16" x 12")	1 of 1
	BC 864.01	In-Line Thrust Blocks (For 4" - 12")	1 of 1
BC 837.25	BC 865.01	Double Caps, Jack and Buttress (For D.I. and C.I. Pipe Only)	1 of 1
BC 837.01	BC 866.01	Anchorage for Upper Vertical Bends (For 4" - 20")	1 of 1
to			
BC 837.03			
BC 837.04	BC 867.01	Buttress for Lower Vertical Bends (For 4" - 20")	1 of 1
to			
BC 837.11			
	BC 868.01	Buttress for Wye Connection (For 4" - 20")	1 of 1
BC 890.01	BC 869.01	Table of Sections Required for Concrete Valve Vaults	1 of 1
BC 890.02	BC 870.01	Standard Sections for Small Concrete Vaults	1 of 3
BC 890.04	BC 870.01	Detail of Small Sectional Concrete Vault	2 of 3
BC 890.05	BC 870.01	Details of "D" and "E" Sections - Small Sectional Concrete Vault	3 of 3
BC 890.02	BC 871.01	Standard Sections for Large Sectional Concrete Vaults	1 of 4
BC 890.06	BC 871.01	Detail of Large Sectional Concrete Vault ("A" and "B" Sections)	2 of 4
BC 890.07	BC 871.01	Detail of Large Sectional Concrete Vault ("C" and "D" Sections)	3 of 4
BC 890.08	BC 871.01	"E" Section and "F" Sections Large Concrete Vault Top Slab	4 of 4

BC 835.03	BC 872.01	7 1/2" Roadway Box Top	1 of 6
BC 835.03	BC 872.01	7 1/2" Roadway Box Bottom	2 of 6
BC 835.04	BC 872.01	7 1/2" Roadway Box Extension	3 of 6
	BC 872.01	7 1/2" Roadway Box Lid (On Resilient or Butterfly Valve)	4 of 6
	BC 872.01	1 1/2", 2", & 2 1/2" Valve Box Riser (Heavy Duty)	5 of 6
BC 890.11	BC 872.01	Standard 7 1/2" Valve Cover - Water	6 of 6
BC 890.12	BC 873.01	Standard 12" Meter Frame	1 of 3
BC 890.13	BC 873.01	Standard 12" Meter Cover	2 of 3
BC 890.14	BC 873.01	Standard 12" Meter Cover - Locking Bolt and Details	3 of 3
BC 890.18	BC 874.01	18" x 12" Meter Frame Adapter	1 of 2
BC 890.19	BC 874.01	18" x 12" Meter Frame Adapter	2 of 2
BC 890.20	BC 875.01	Standard 18" Manhole Cover - Water	1 of 2
BC 890.21	BC 875.01	Standard 18" Manhole Frame	2 of 2
BC 890.22	BC 876.01	Standard 24" Manhole Cover - Water	1 of 2
BC 890.23	BC 876.01	Standard 24" Manhole Frame - Water	2 of 2
BC 890.24	BC 877.01	Standard 30" Manhole Cover - Water	1 of 2
BC 890.25	BC 877.01	Standard 30" Manhole Frame - Water	2 of 2



PLAN



- NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.
2. CONCRETE SHALL BE MIX 3.

SECTION A-A



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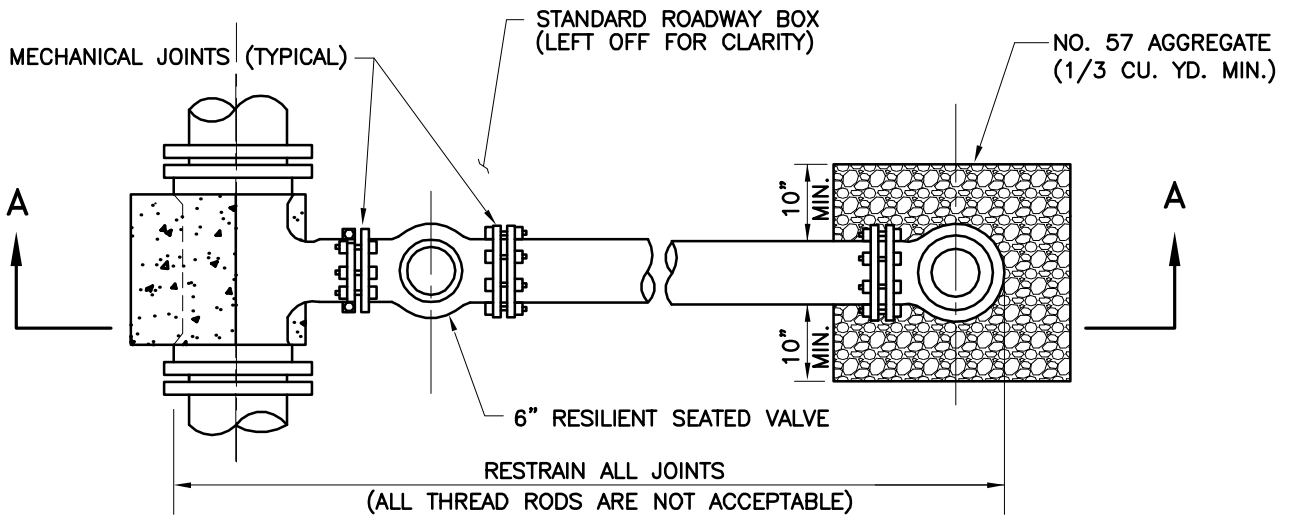
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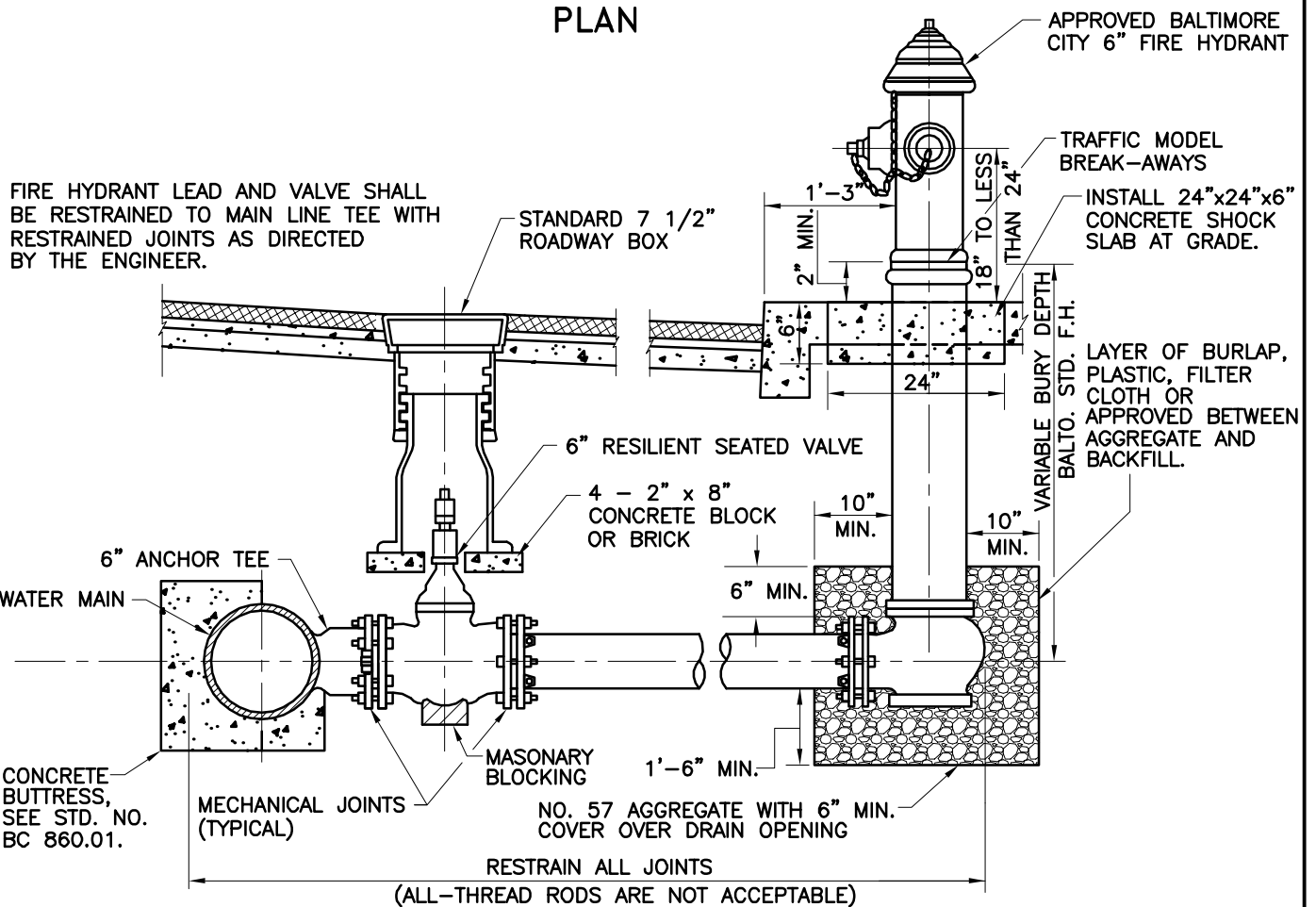
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STANDARD INSTALLATION
OF FIRE HYDRANT
WITH TEE AND VALVE
(SECTIONAL VAULT)

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 833.01		
SCALE: NONE		SHEET 1 OF 1



PLAN



NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.

2. CONCRETE SHALL BE MIX 3.

SECTION A-A



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STANDARD INSTALLATION
OF FIRE HYDRANT
WITH TEE AND VALVE
(ROADWAY BOX)

ISSUED

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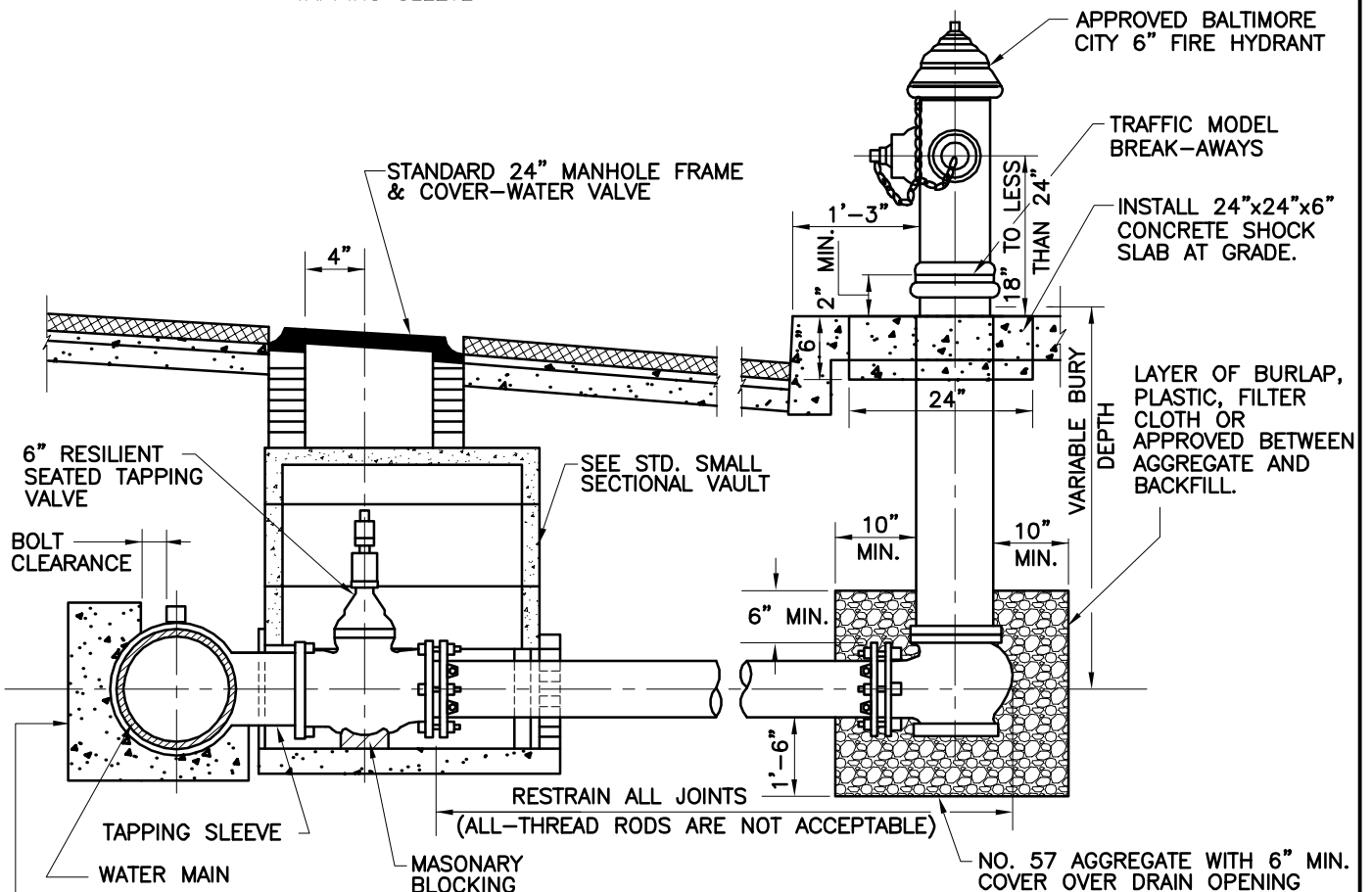
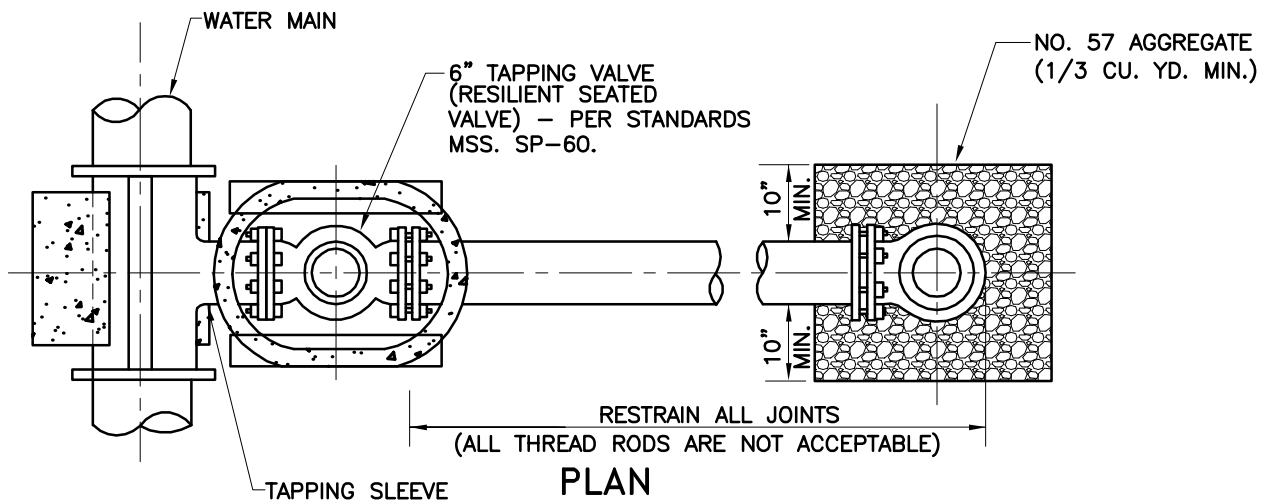
REVISED

3 / 2008

STANDARD NO.
BC 833.02

SCALE : NONE

SHEET 1 OF 1



NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH. ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.

2. CONCRETE SHALL BE MIX 3.

ELEVATION



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BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
OF FIRE HYDRANT WITH
TAPPING SLEEVE AND VALVE
(SECTIONAL VAULT)

ISSUED

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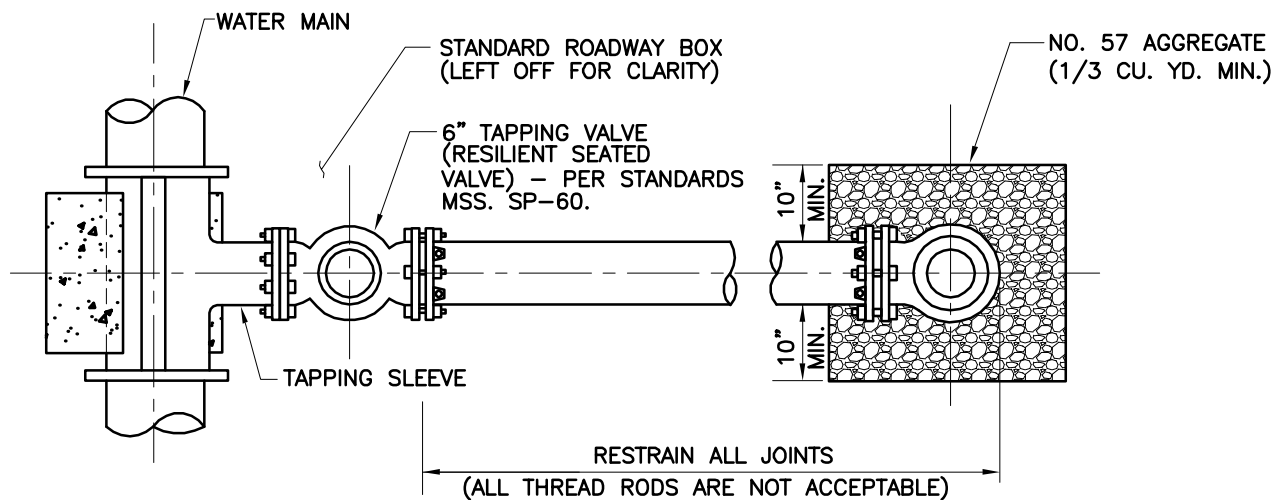
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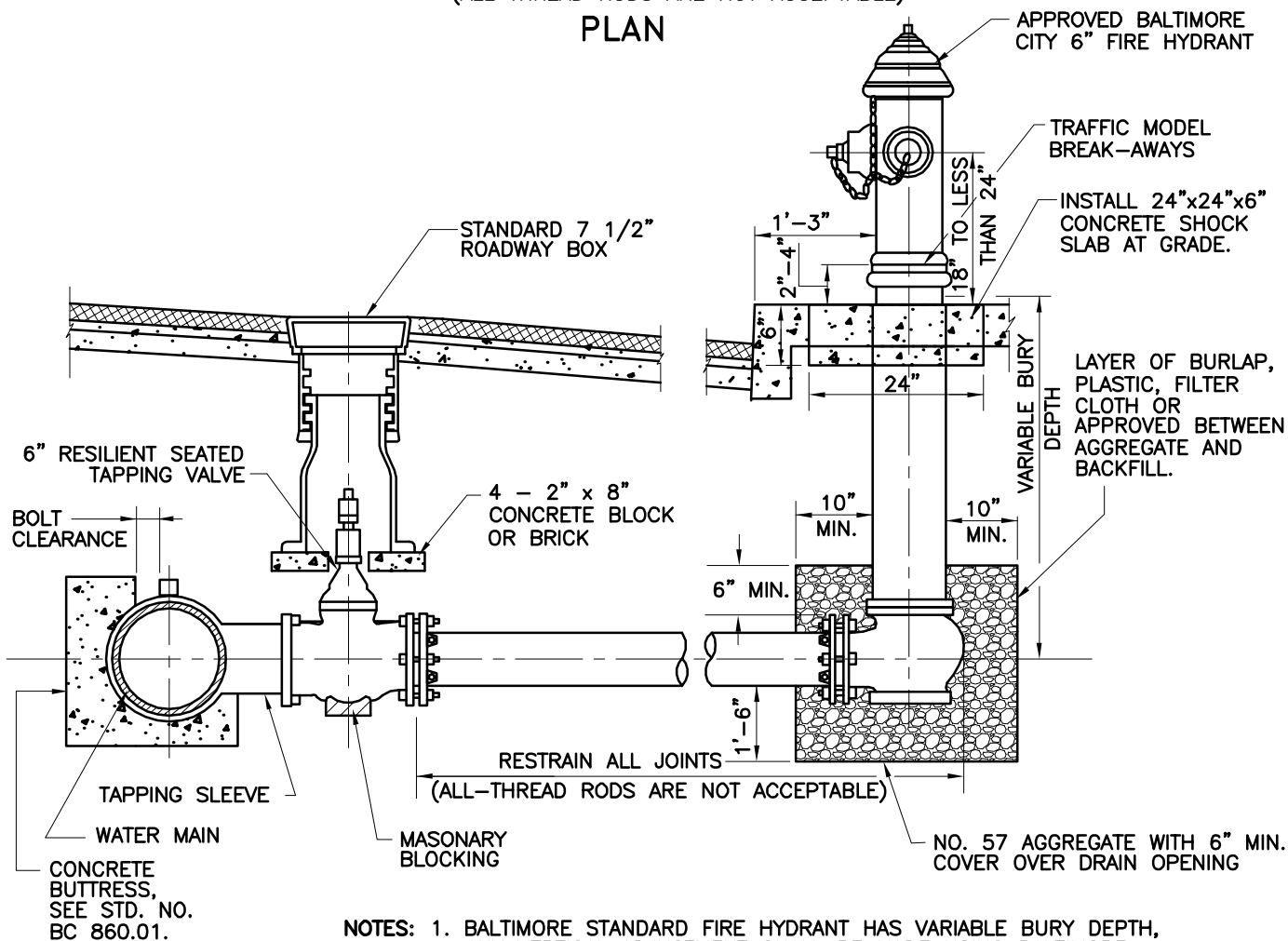
STANDARD NO.
BC 833.03

SCALE : NONE

SHEET 1 OF 1



PLAN



NOTES: 1. BALTIMORE STANDARD FIRE HYDRANT HAS VARIABLE BURY DEPTH, ANY VERTICAL ADJUSTMENT SHALL BE MADE USING BALTIMORE STD. FIRE HYDRANT EXTENSION PIECES.

2. CONCRETE SHALL BE MIX 3.

ELEVATION



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STANDARD INSTALLATION
OF FIRE HYDRANT WITH
TAPPING SLEEVE AND VALVE
(ROADWAY BOX)

ISSUED

REVISED

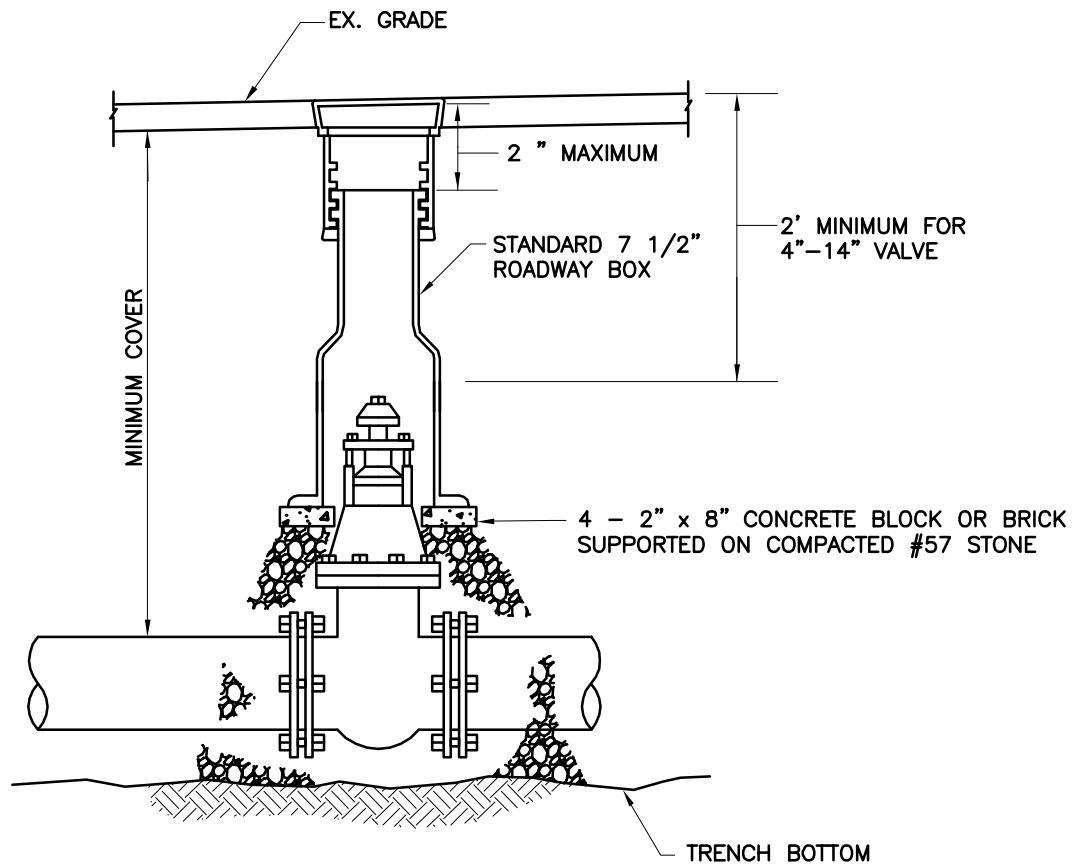
REVISED

3 / 2008

STANDARD NO.
BC 833.04

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. NORMAL SETTING FOR 4"-14" SHOWN
2. DIMENSIONS NOTED MAY VARY DEPENDING ON MANUFACTURER



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STANDARD INSTALLATION
 OF RESILIENT - SEATED
 VALVE WITH ROADWAY BOX
 (4" - 14")

ISSUED

REVISED

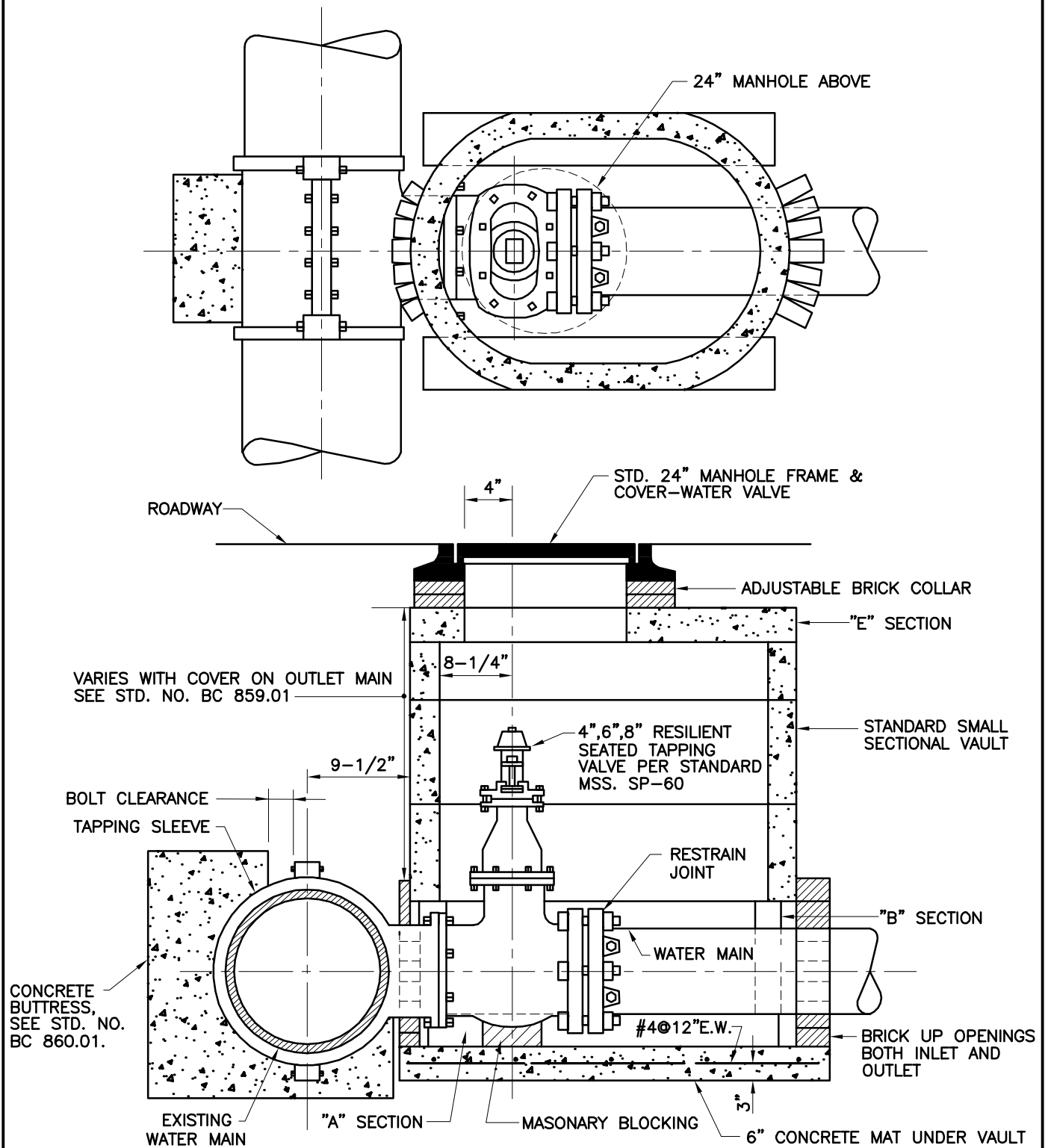
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3 / 2008

STANDARD NO.
 BC 834.01

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER & WASTEWATER APPROVED STANDARDS.
2. FOR DIMENSIONS & REINFORCEMENT OF THE VARIOUS SECTIONS, SEE STD. NO. BC 870.



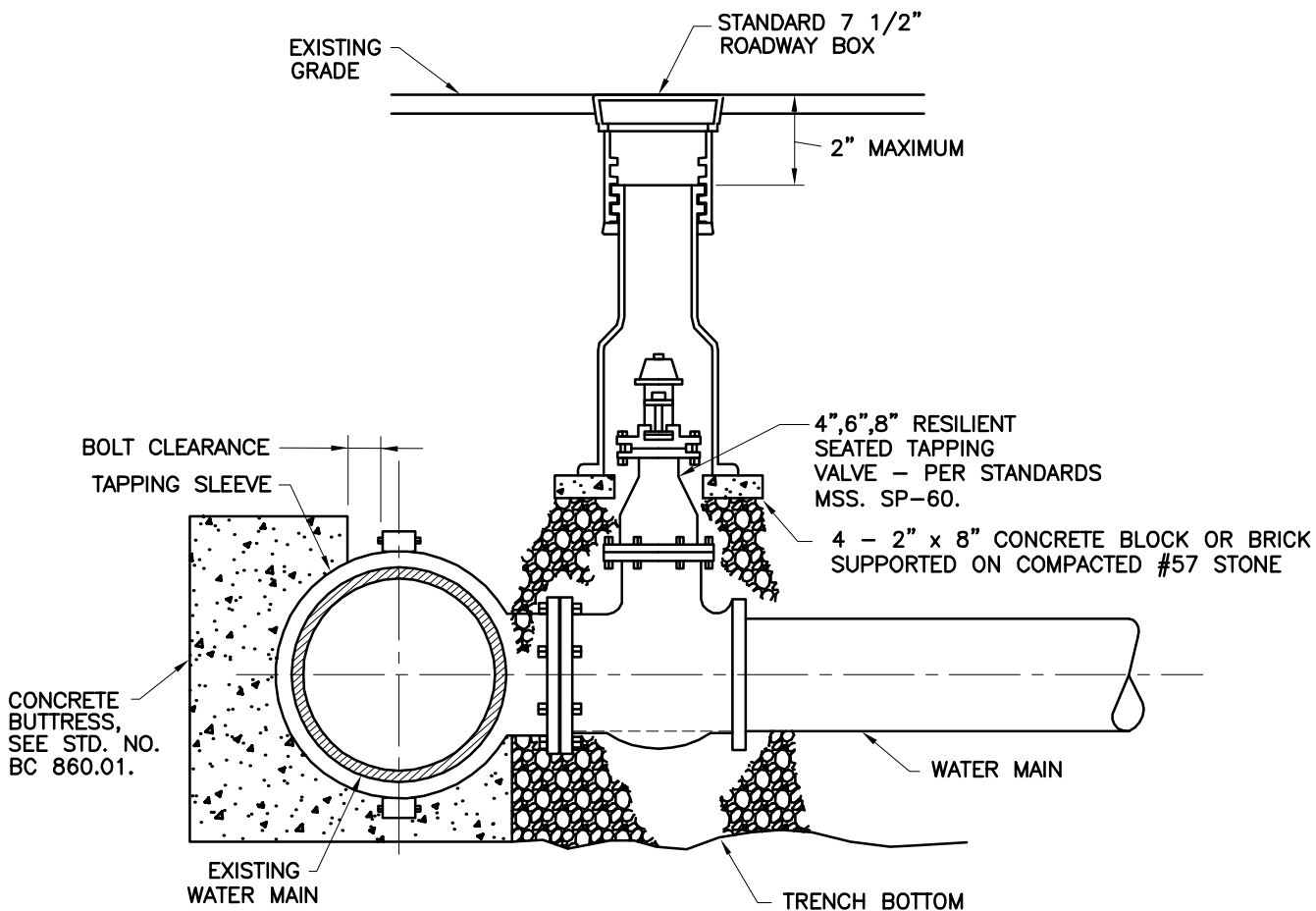
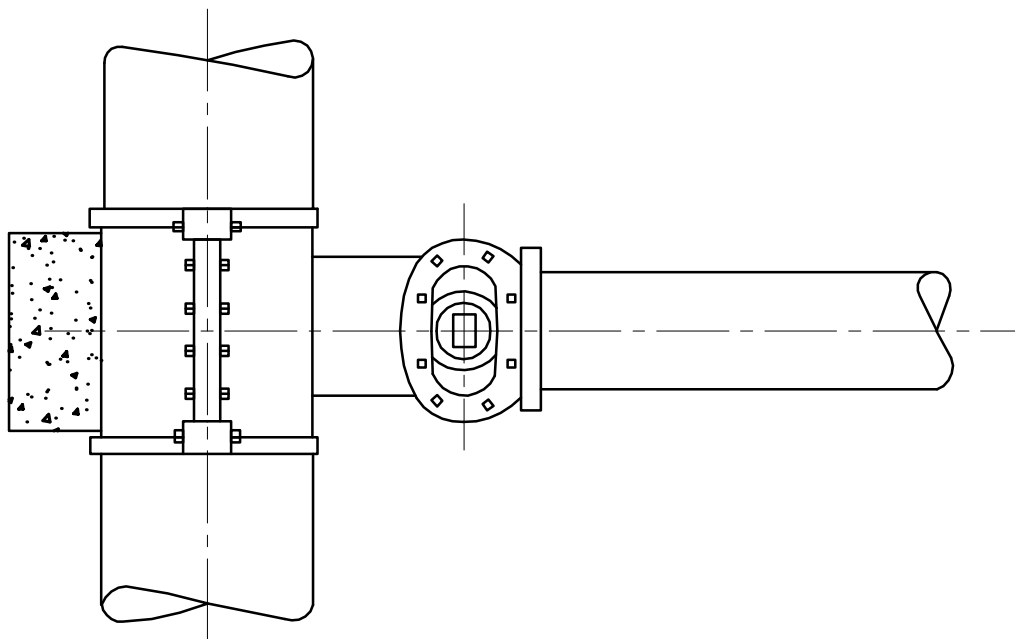
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STANDARD INSTALLATION
OF TAPPING VALVE WITH
SMALL SECTIONAL VAULT
(4" - 8")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.02		
SCALE : NONE		SHEET 1 OF 1



NOTE:
ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER & WASTEWATER APPROVED STANDARDS.

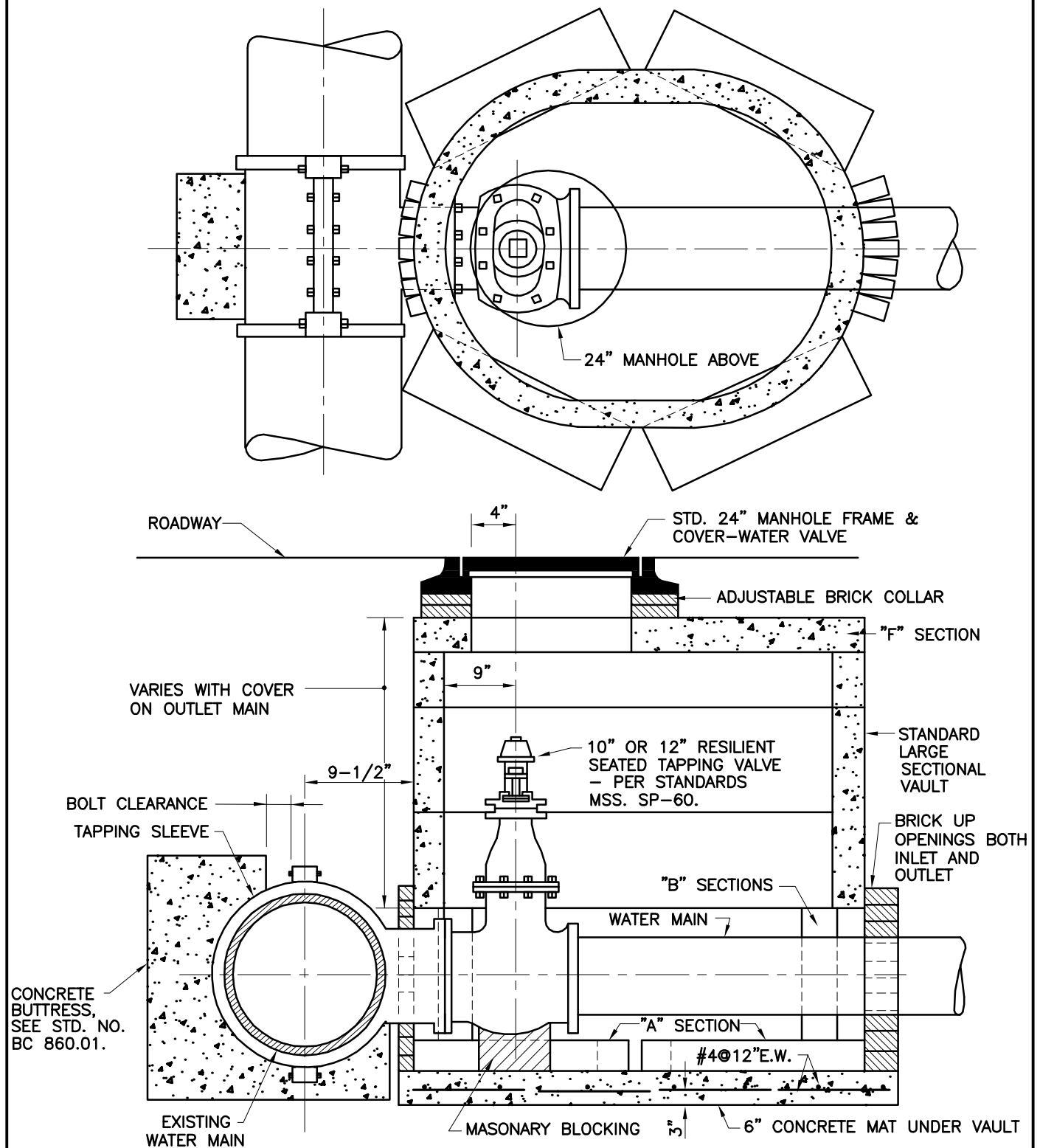


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STANDARD INSTALLATION
OF TAPPING VALVE
WITH ROADWAY BOX
(4" - 8")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.03		
SCALE : NONE		SHEET 1 OF 1



NOTES:

1. ALL TAPPING VALVES SHALL CONFORM TO DPW - WATER & WASTEWATER APPROVED STANDARDS.
2. FOR DIMENSIONS & REINFORCEMENT OF THE VARIOUS SECTIONS, SEE STD. NO. BC 871.



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STANDARD INSTALLATION
OF TAPPING VALVE WITH
LARGE SECTIONAL VAULT
(10" - 12")

ISSUED

REVISED

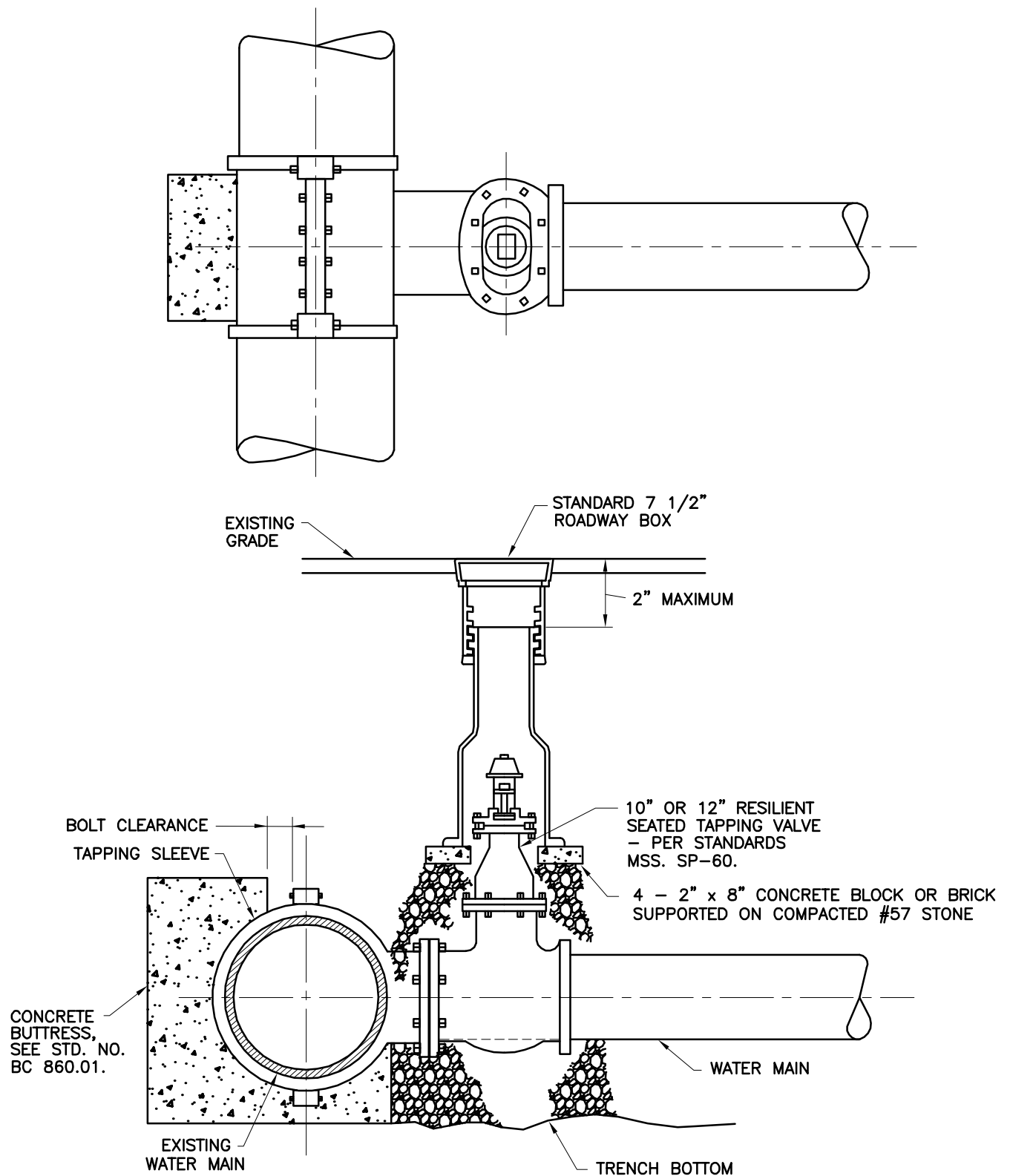
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STANDARD NO.
BC 834.04

SCALE : NONE

SHEET 1 OF 1



NOTE:
ALL TAPPING VALVES SHALL CONFORM TO DPW – WATER &
WASTEWATER APPROVED STANDARDS.

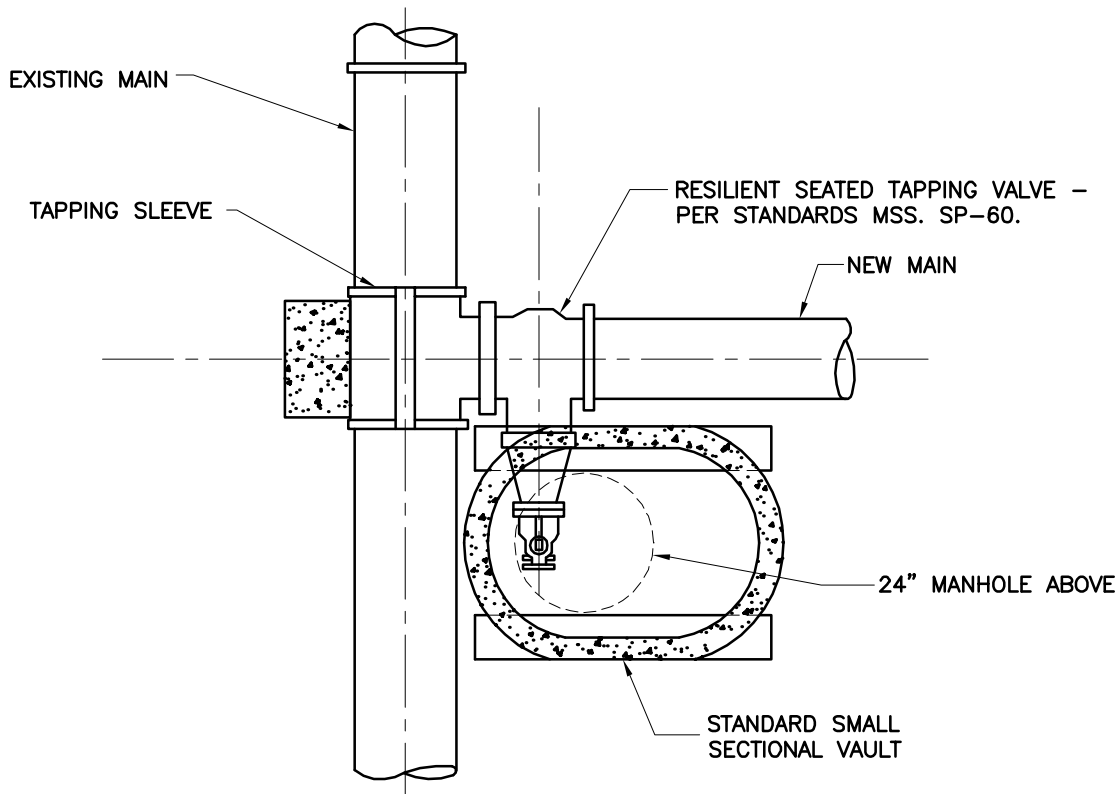


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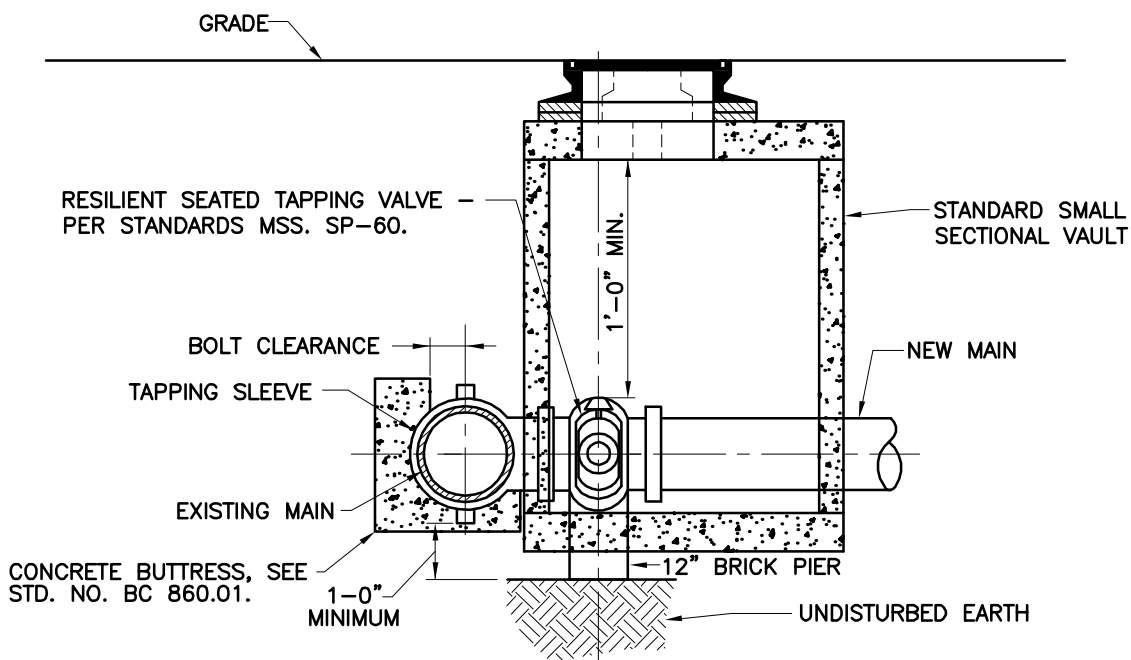
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STANDARD INSTALLATION
OF TAPPING VALVE
WITH ROADWAY BOX
(10" - 12")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.05		
SCALE : NONE		SHEET 1 OF 1


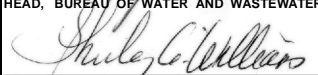


PLAN



ELEVATION



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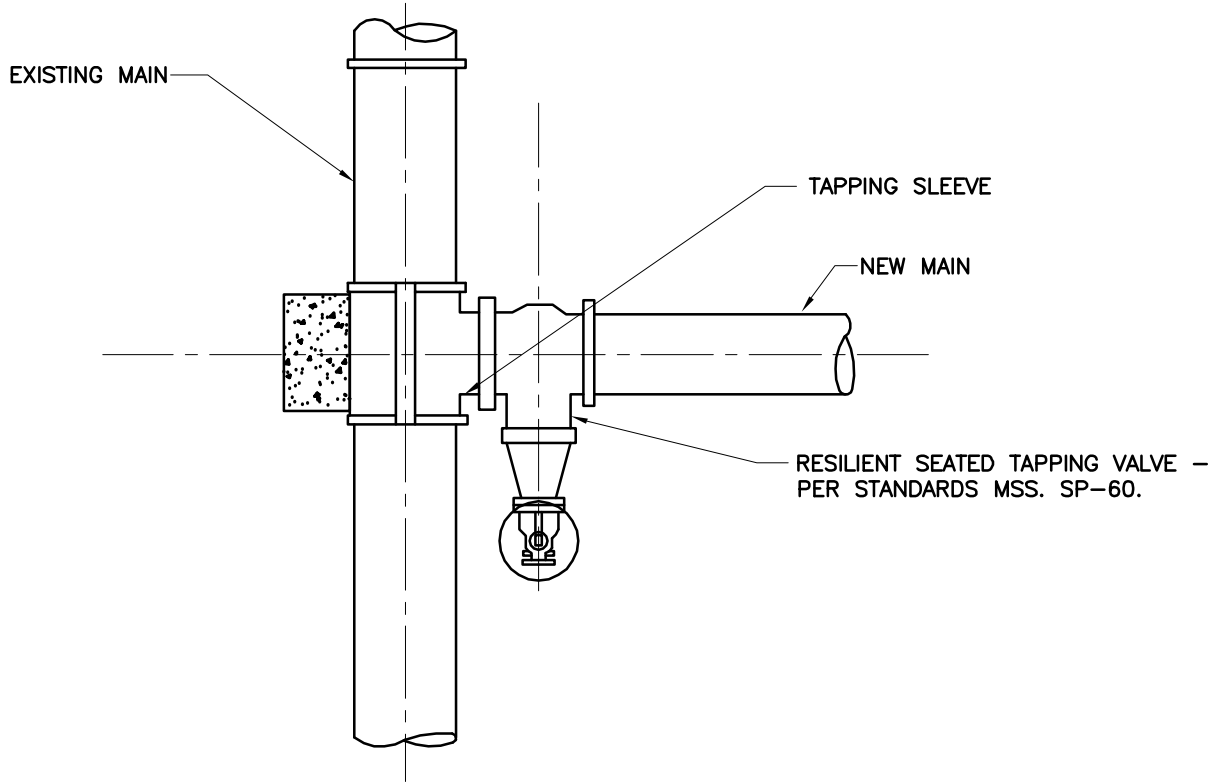
STANDARD INSTALLATION
 OF TAPPING SLEEVE AND
 HORIZONTAL VALVE WITH
 SECTIONAL VAULT (4" - 24")

ISSUED	REVISED	REVISED
3 / 2008		

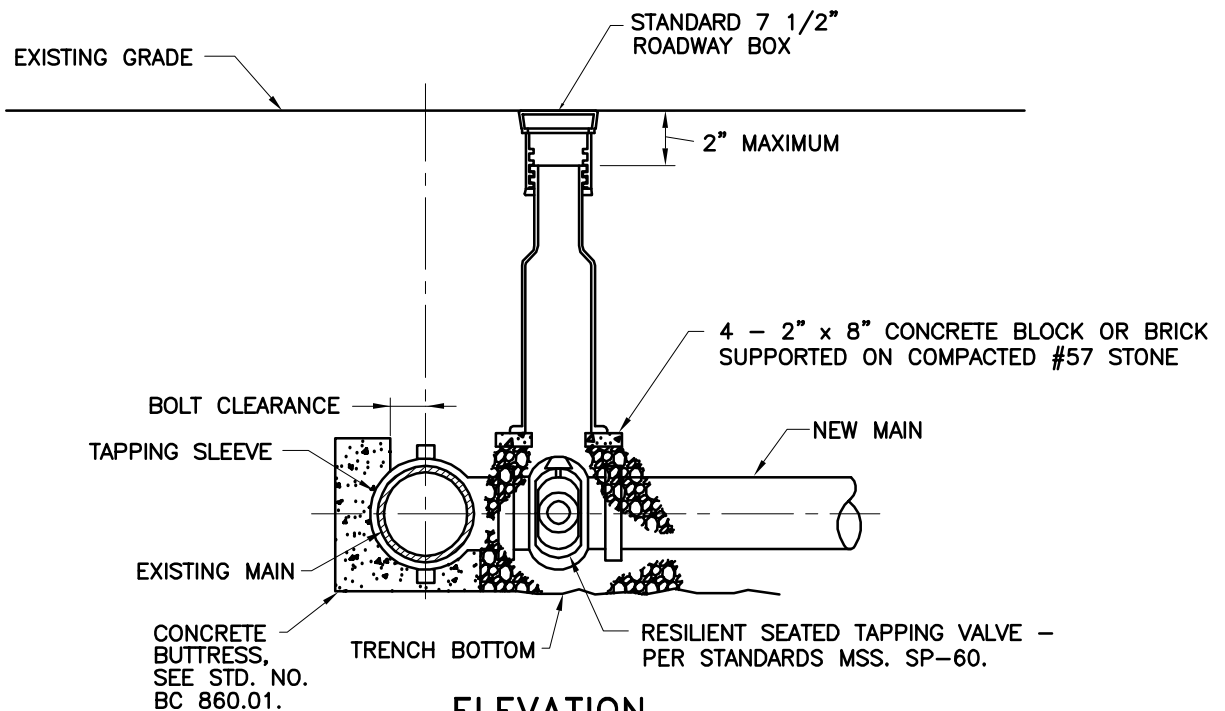
STANDARD NO.
 BC 834.06

SCALE : NONE

SHEET 1 OF 1



PLAN



ELEVATION

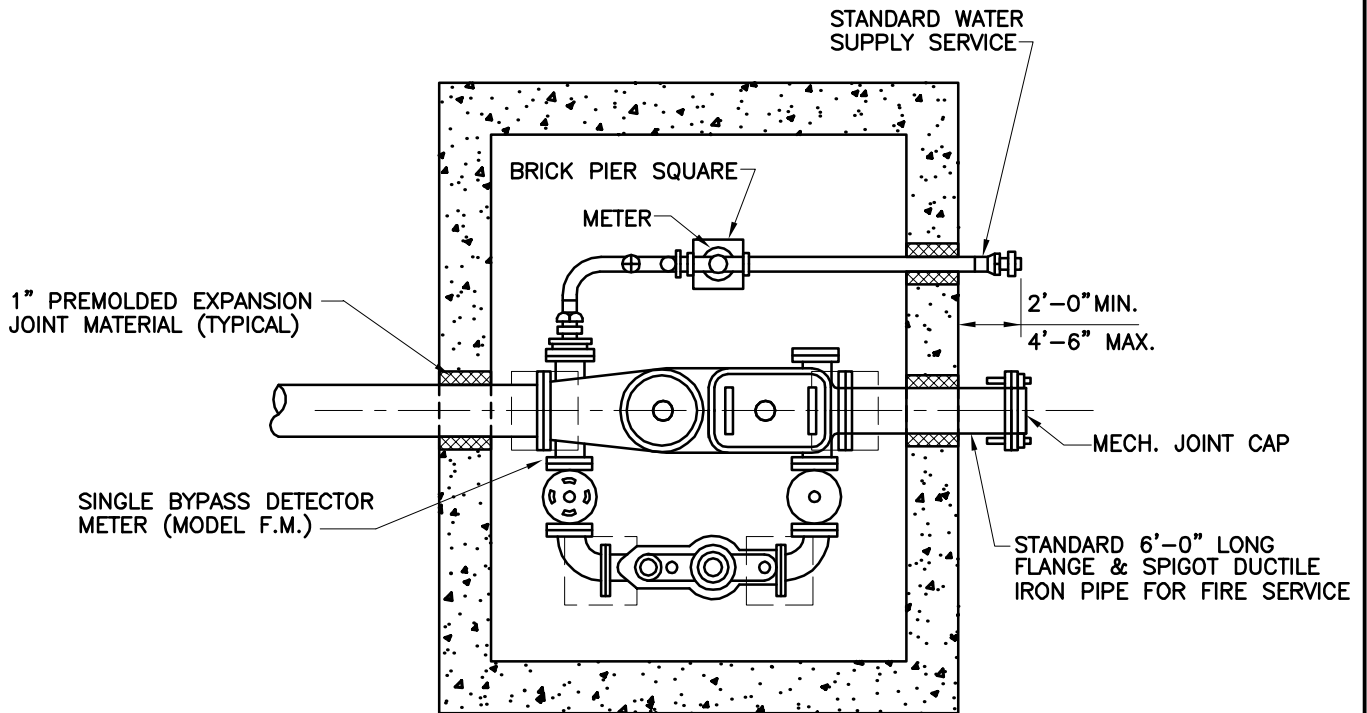


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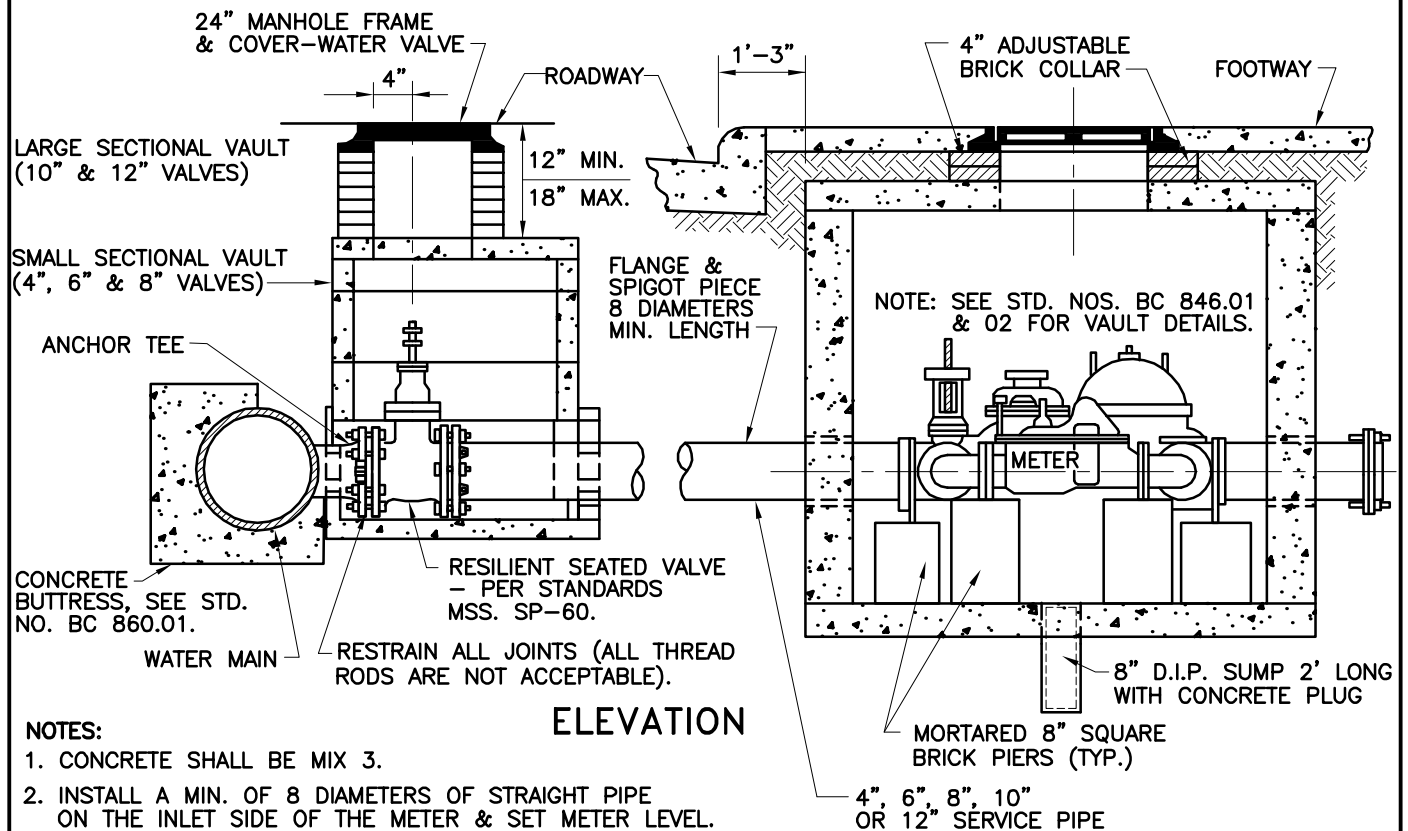
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STANDARD INSTALLATION
 OF TAPPING SLEEVE AND
 HORIZONTAL VALVE WITH
 ROADWAY BOX (4" - 24")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 834.07		
SCALE : NONE		SHEET 1 OF 1



PLAN (METER VAULT ONLY)



ELEVATION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER & SET METER LEVEL.



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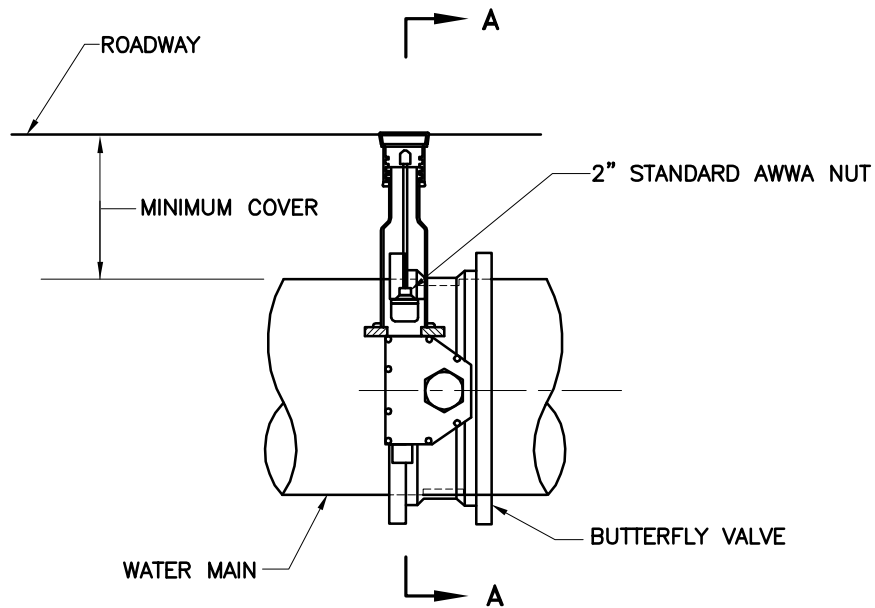
STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(OUTSIDE FIRE HYDRANTS) WITH
TEE AND VALVE (SECTIONAL VAULT)

ISSUED	REVISED	REVISED
3 / 2008		

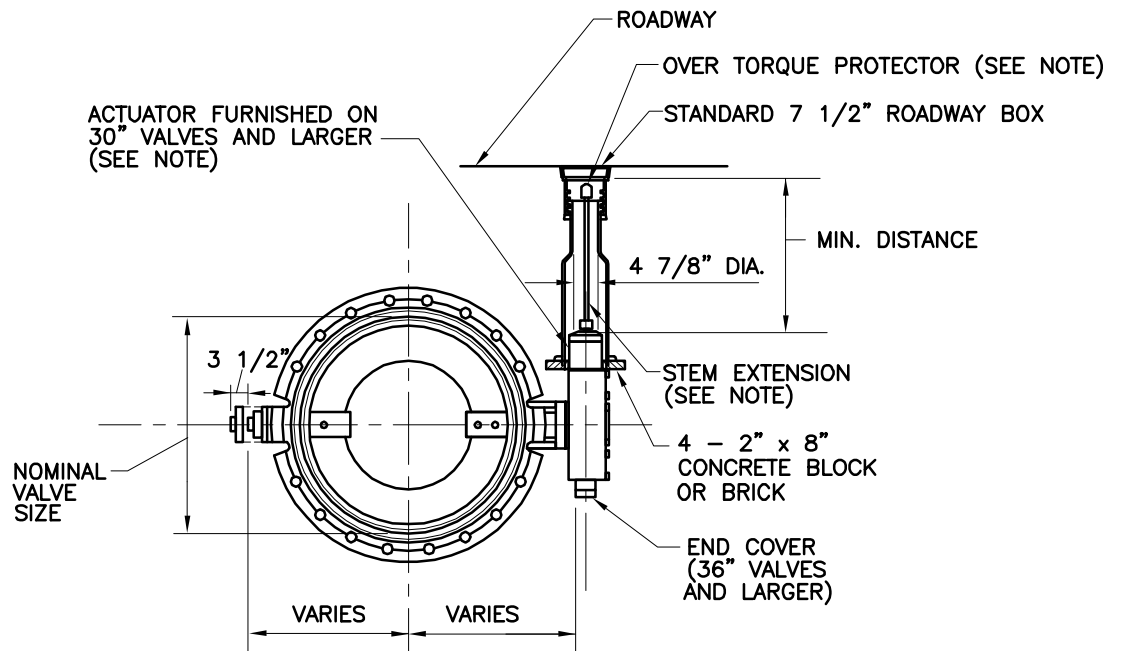
STANDARD NO.
BC 850.01

SCALE: NONE

SHEET 1 OF 1



ELEVATION



NOTE:
SEE DPW BUTTERFLY VALVE
SPECIFICATION FOR ALL BUTTERFLY
VALVES 30"-72"

SECTION A-A



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STANDARD INSTALLATION
OF BUTTERFLY VALVE
WITH ROADWAY BOX
(30" - 72")

ISSUED

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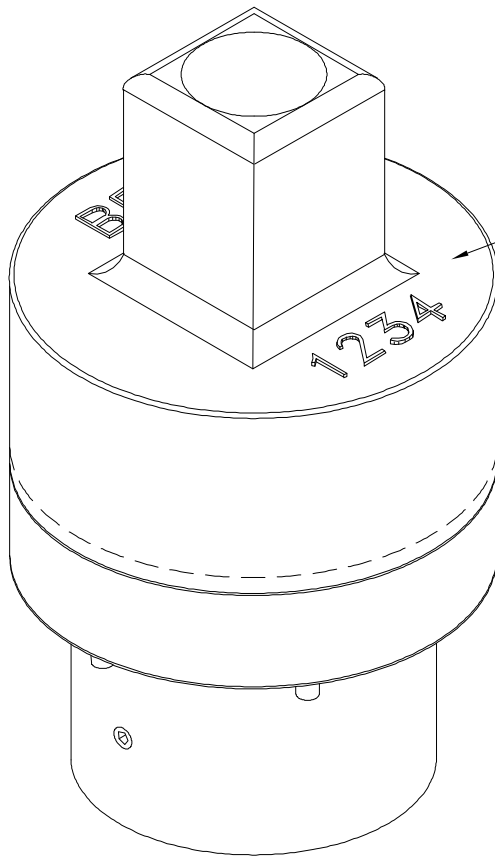
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STANDARD NO.
BC 835.02

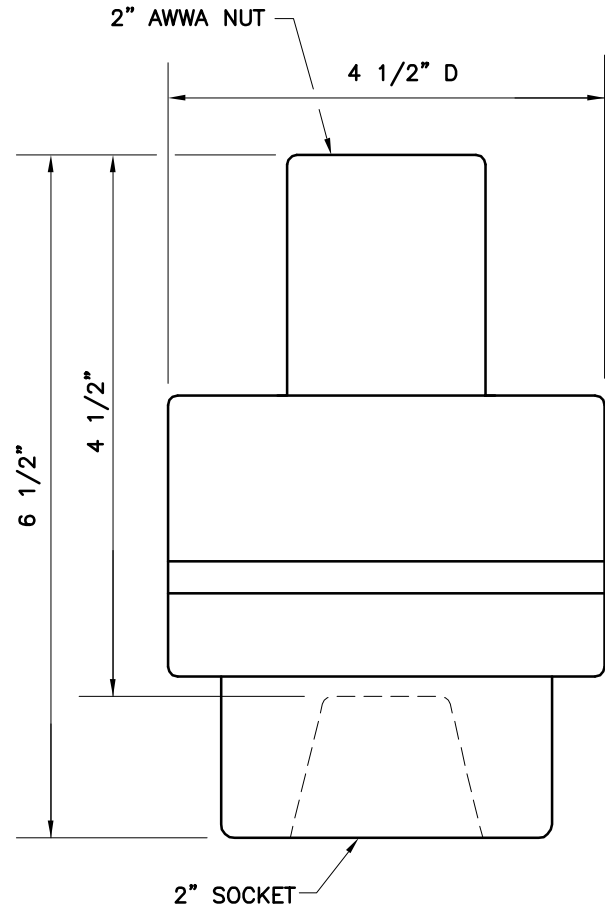
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SHEET 1 OF 1


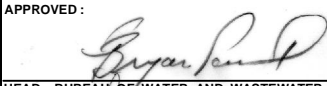
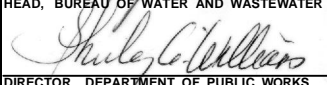


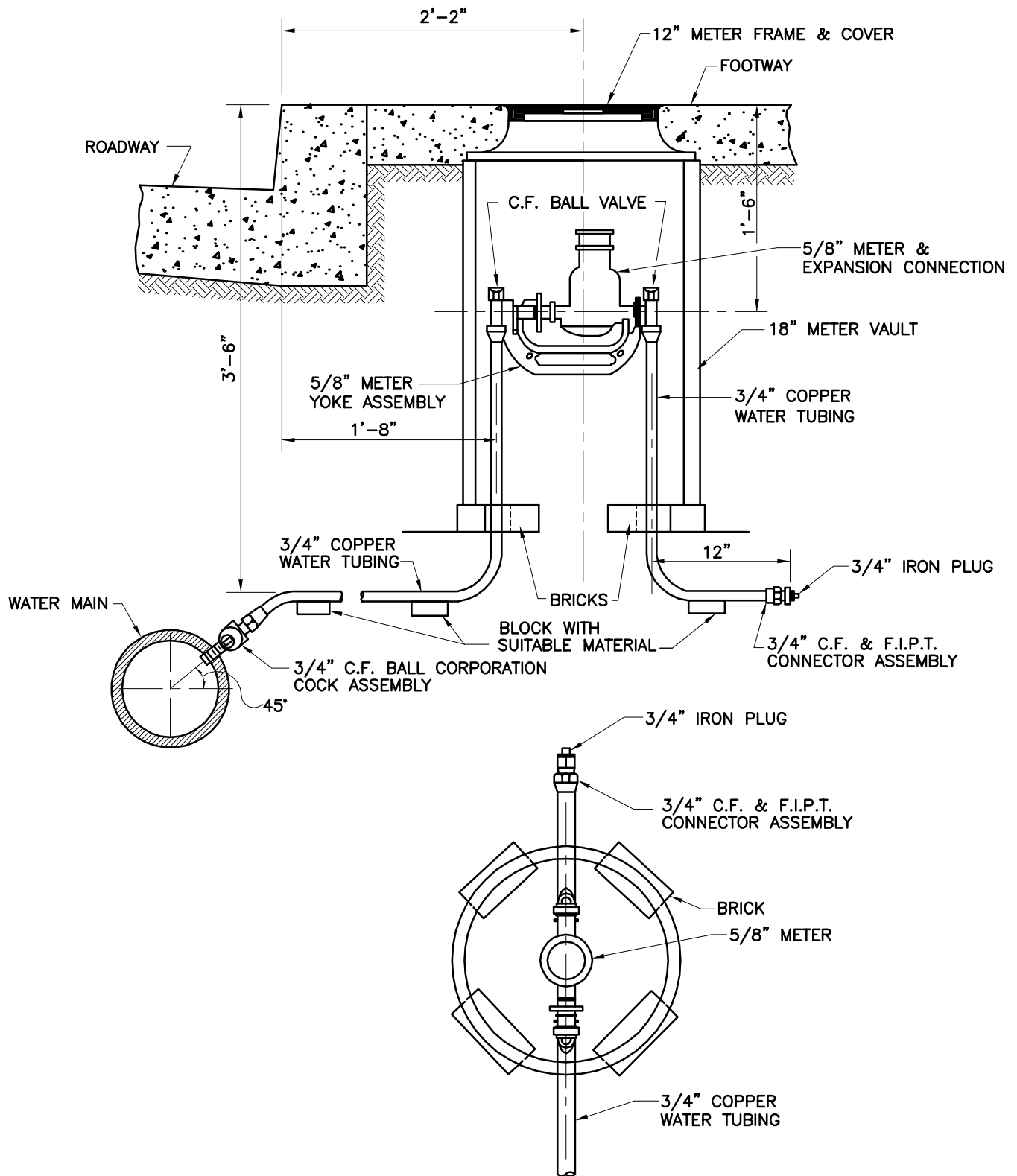
IDENTIFICATION DISK

INCLUDE: VALVE SIZE, VALVE TYPE (I.E., BUTTERFLY VALVE-BFV), & NUMBER OF TURNS TO OPEN WITH ARROW


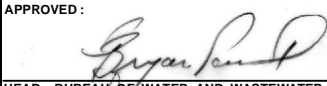
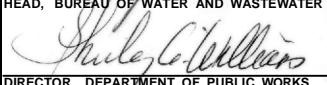


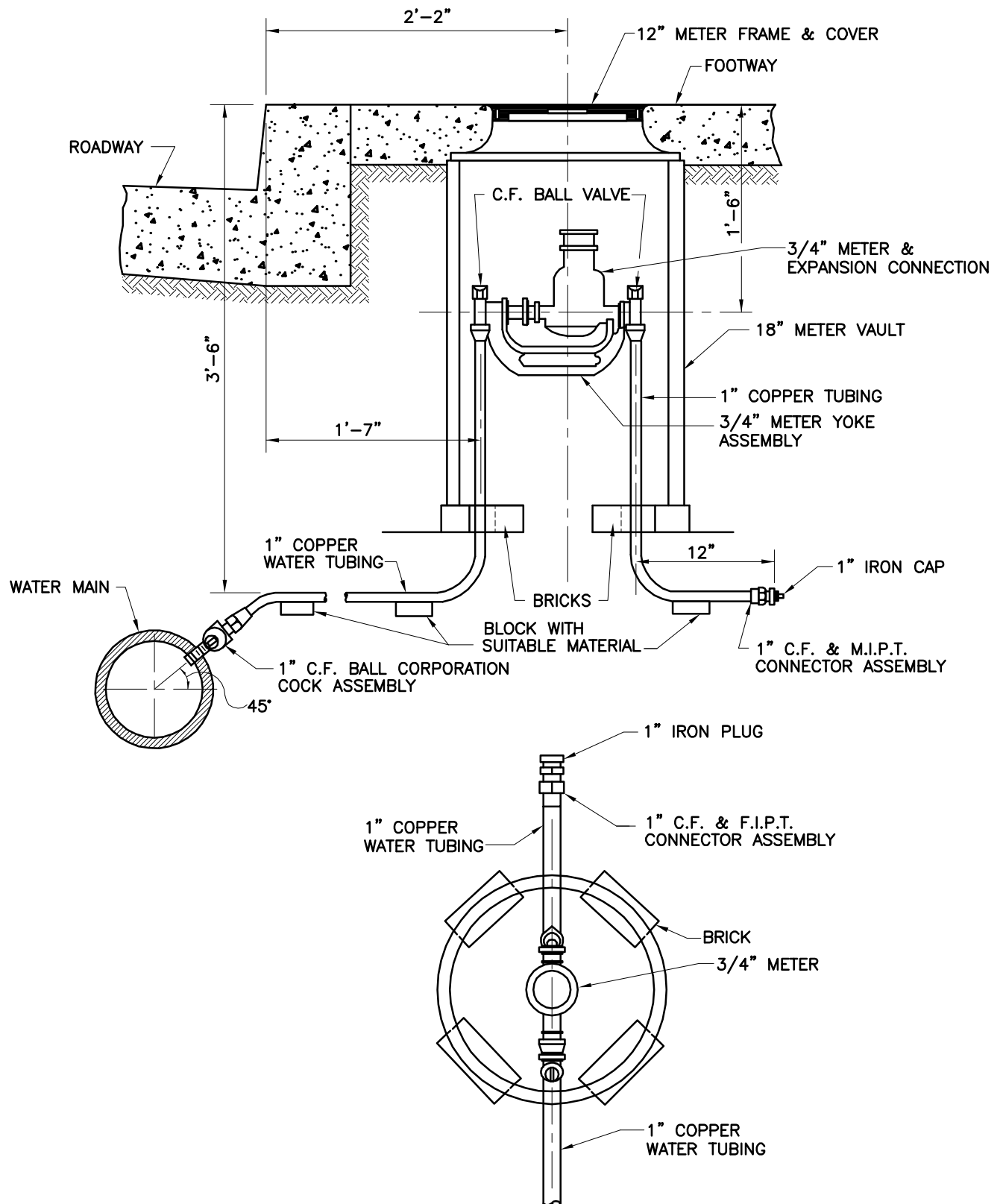
USE: AUNSPACH CONTROLS, MODEL D86 BW-250 VALVE
OVER TORQUE PROTECTOR OR APPROVED EQUAL

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD BUTTERFLY VALVE OVER TORQUE PROTECTOR	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 835.03		
			SCALE : NONE		SHEET 1 OF 1




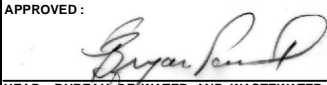
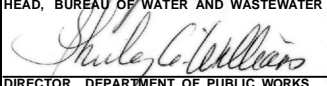
NOTE:
SEE STD NO. BC 853.01 FOR METER VAULT.

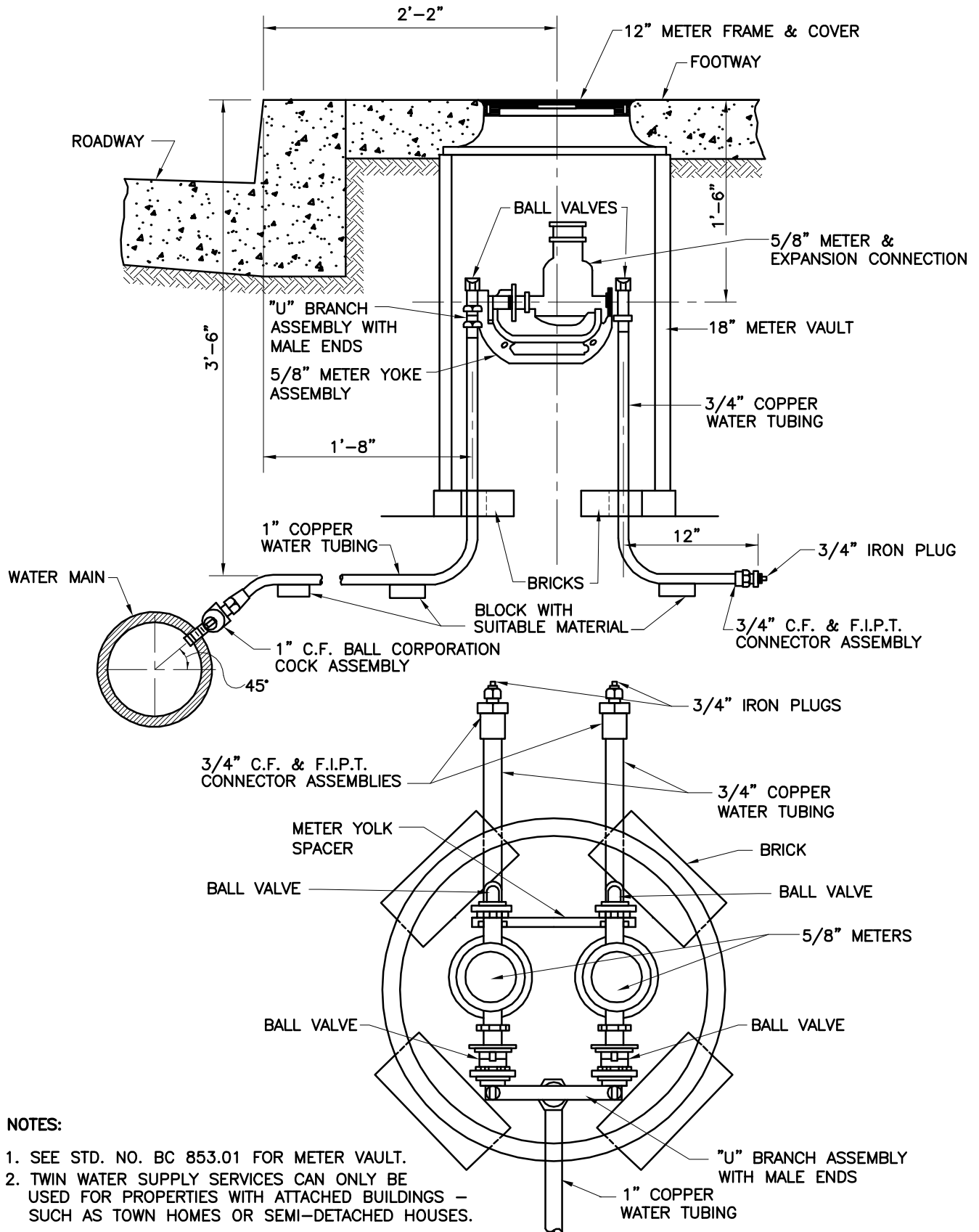
	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 3/4" WATER SUPPLY SERVICE (5/8" METER)	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 836.01		
			SCALE : NONE	SHEET 1 OF 1	



NOTE:

SEE STD NO. BC 853.01 FOR METER VAULT.

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 1" WATER SUPPLY SERVICE (3/4" METER)	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 837.01		
			SCALE : NONE	SHEET 1 OF 1	



NOTES:

1. SEE STD. NO. BC 853.01 FOR METER VAULT.
2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS — SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.



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CITY OF BALTIMORE
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BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
TWIN WATER SUPPLY
SERVICES (5/8" METERS)

ISSUED

REVISED

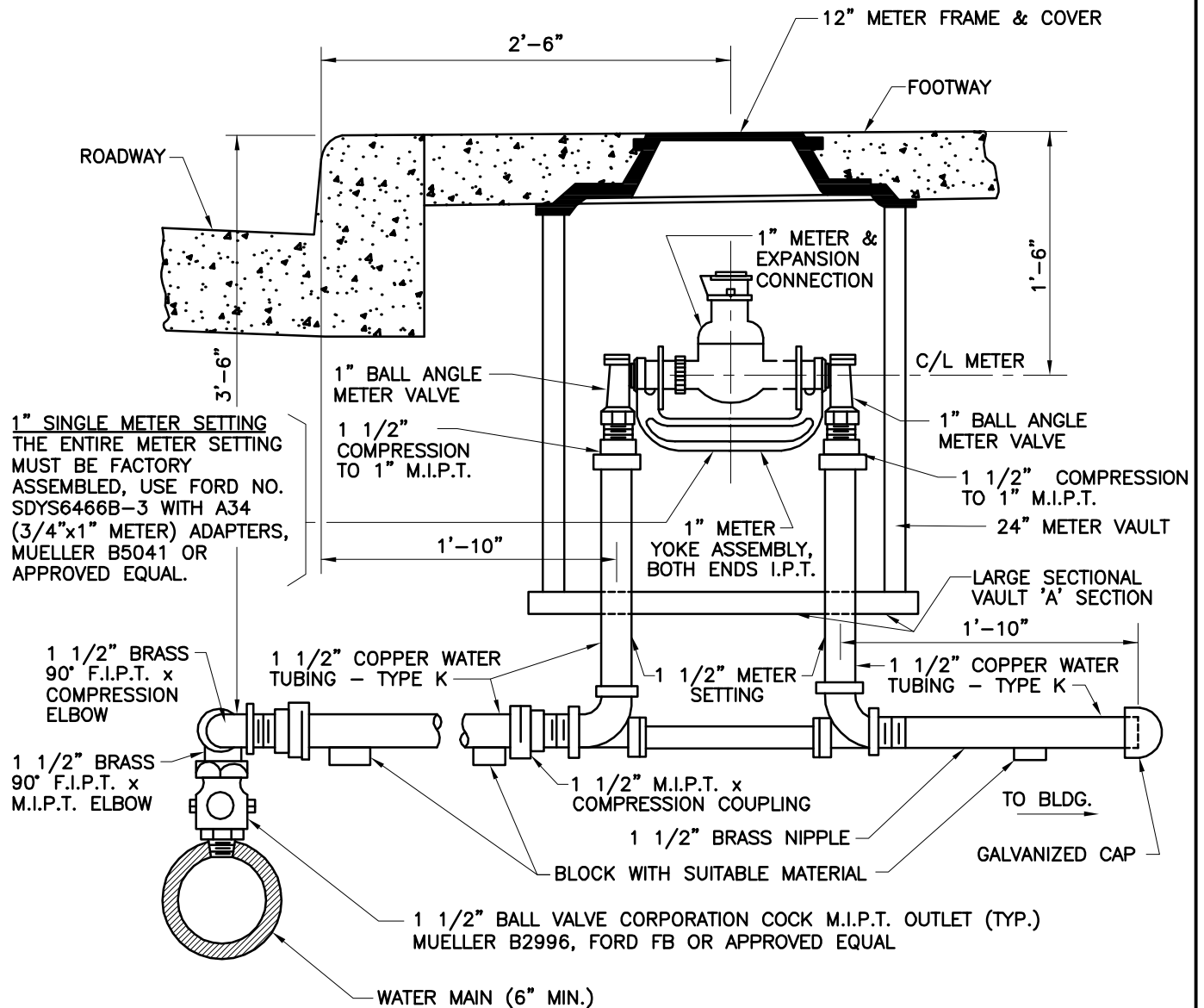
REVISED

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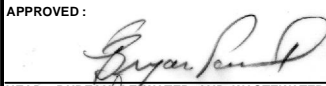

STANDARD NO.
BC 838.01

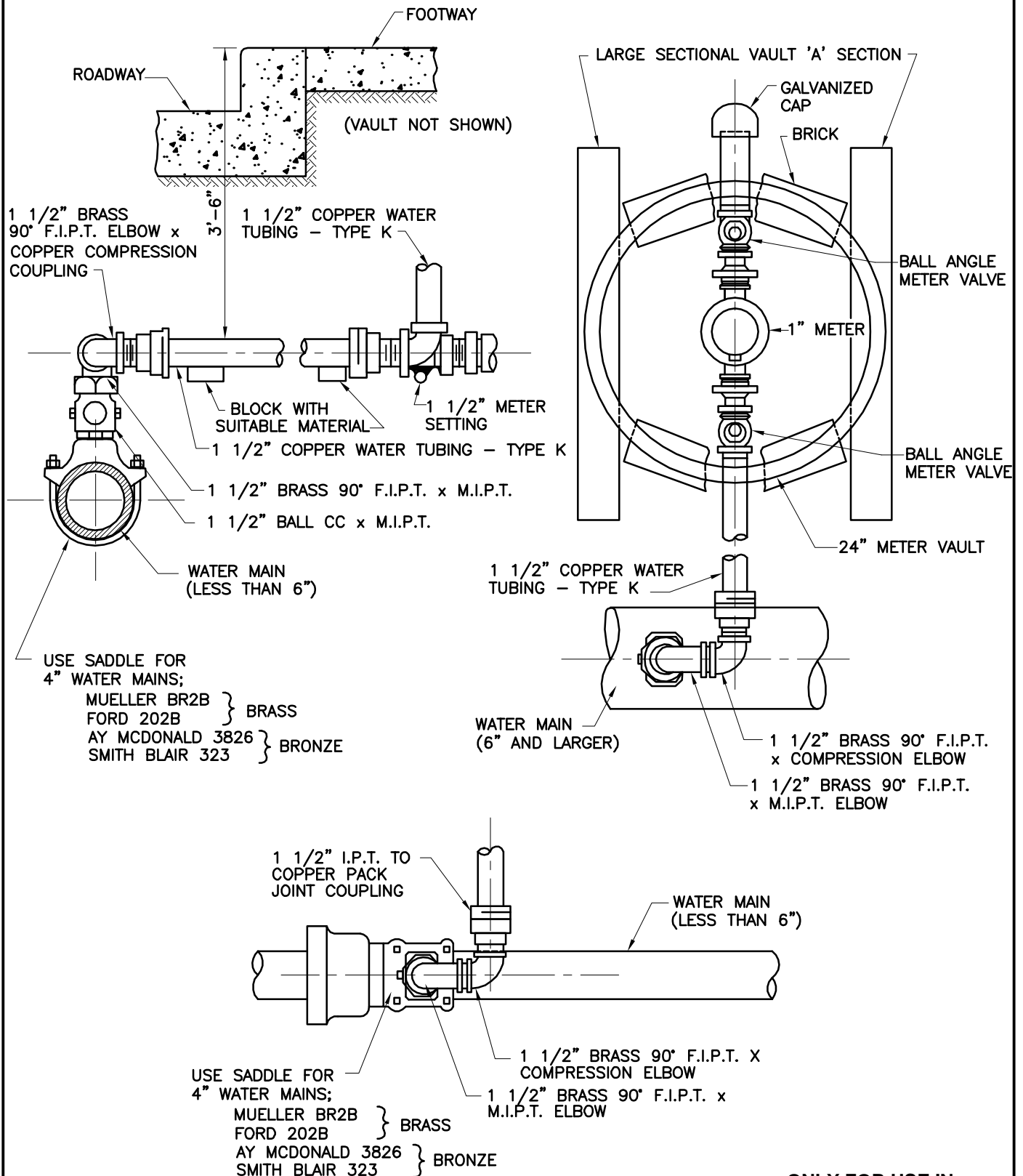
SCALE : NONE

SHEET 1 OF 1



NOTE:
SEE STD. NO. BC 853.01 FOR METER VAULT.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	HEAD, BUREAU OF WATER AND WASTEWATER		STANDARD NO. BC 839.01		
					
DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD INSTALLATION OF 1 1/2" WATER SUPPLY SERVICE (1" METER) FOR 6" MAIN AND LARGER	SCALE : NONE	SHEET 1 OF 1		

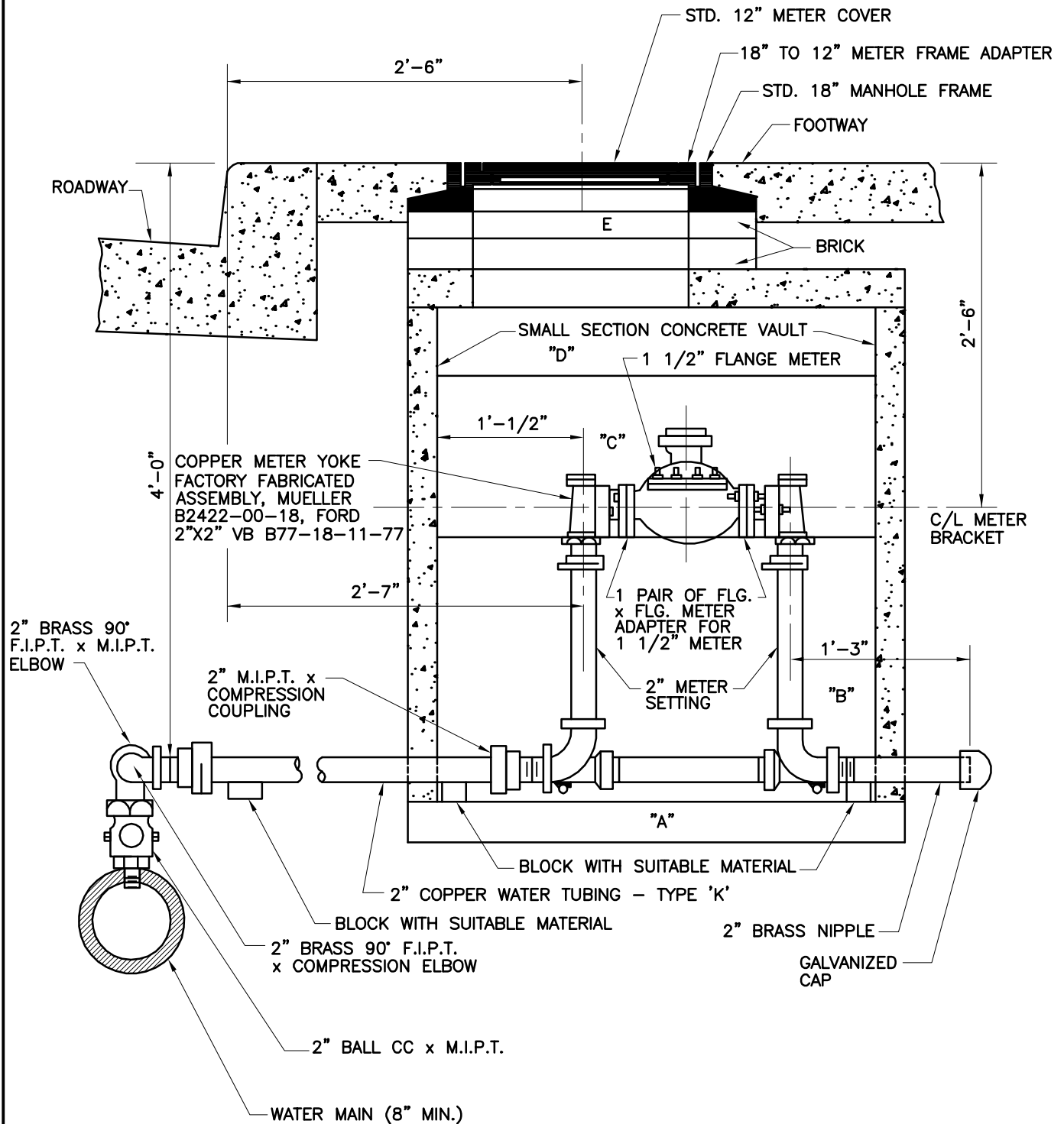





NOTES:

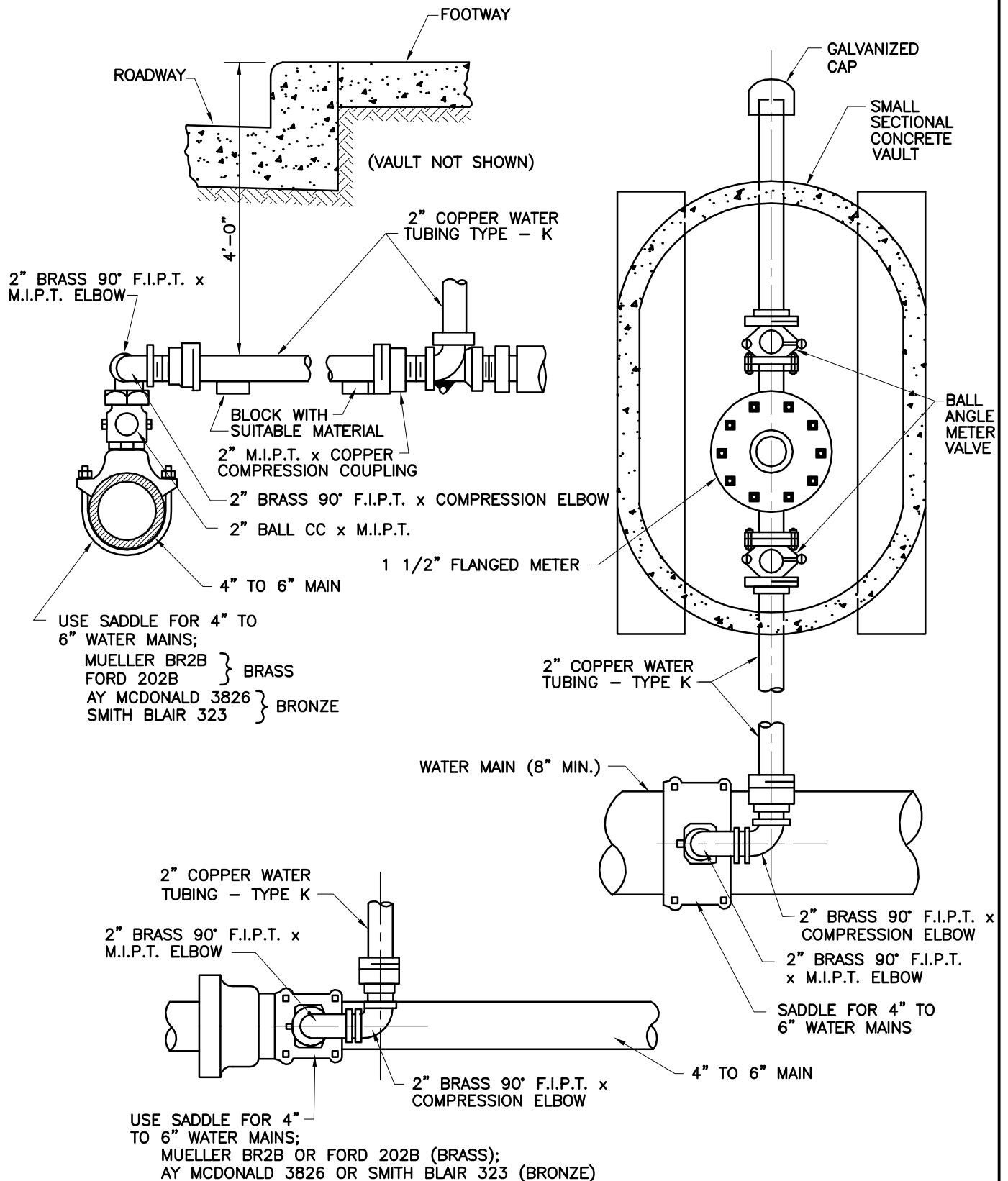
1. FOR METER SETTINGS, SEE STD. NO. BC 839.01.
2. SEE STD. NO. BC 853.01 FOR METER VAULT.

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	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	HEAD, BUREAU OF WATER AND WASTEWATER		STANDARD NO. BC 839.02		
DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD INSTALLATION OF 1 1/2" WATER SUPPLY SERVICE (1" METER) FOR MAINS SMALLER THAN 6"	SCALE : NONE	SHEET 1 OF 1		

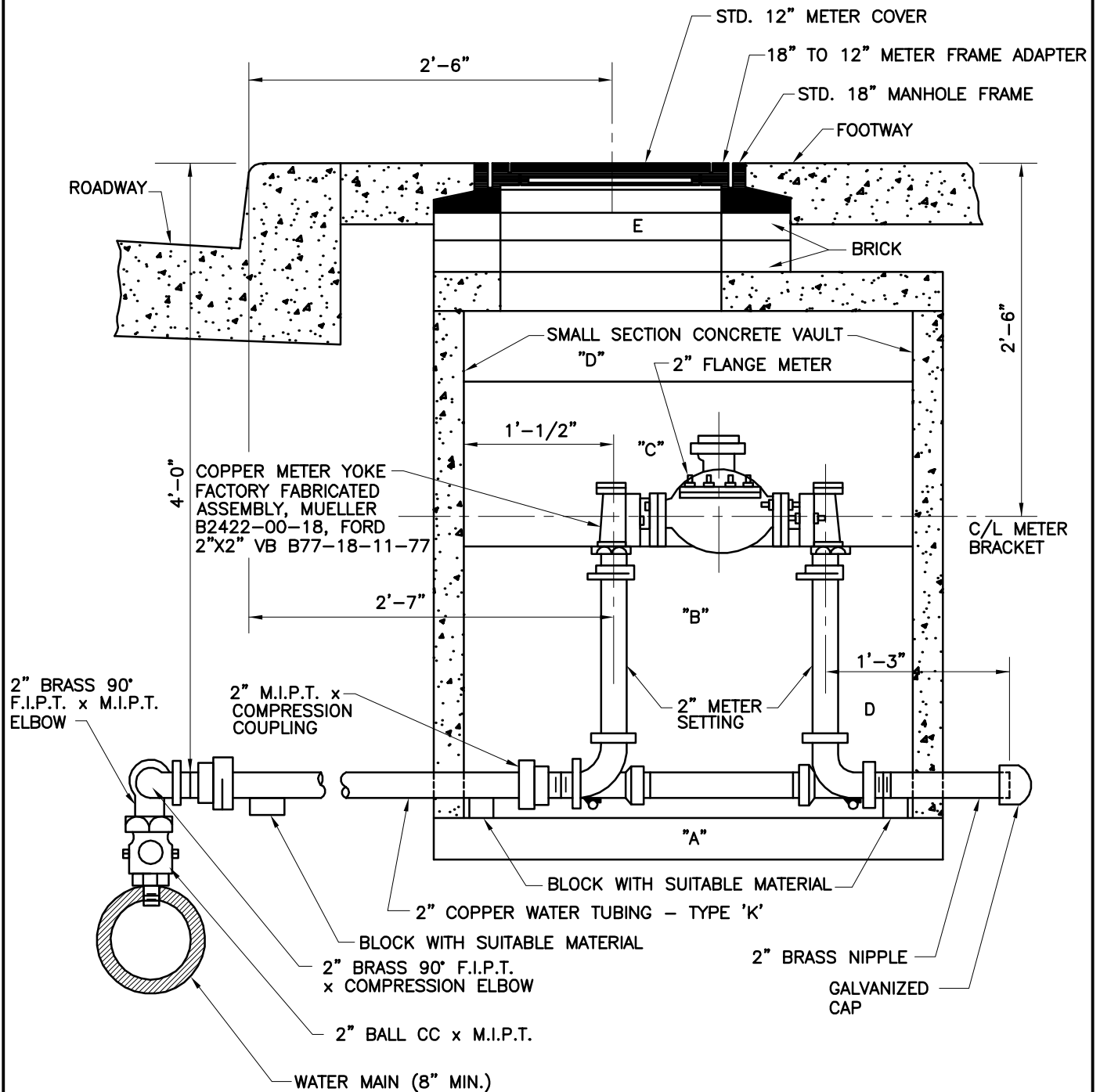


	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	HEAD, BUREAU OF WATER AND WASTEWATER		STANDARD NO. BC 840.01		
					
DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD INSTALLATION OF 2" WATER SUPPLY SERVICE (1 1/2" METER) FOR 8" MAIN AND LARGER	SCALE : NONE	SHEET 1 OF 1		



NOTE: FOR METER SETTINGS, SEE STD. NO. BC 840.01.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD INSTALLATION OF 2" WATER SUPPLY SERVICE (1 1/2" METER) FOR 6" MAIN AND SMALLER	STANDARD NO. BC 840.02	SCALE : NONE		
			SHEET 1 OF 1		



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
2" WATER SUPPLY SERVICE
(2" METER) FOR
8" MAIN AND LARGER

ISSUED

REVISED

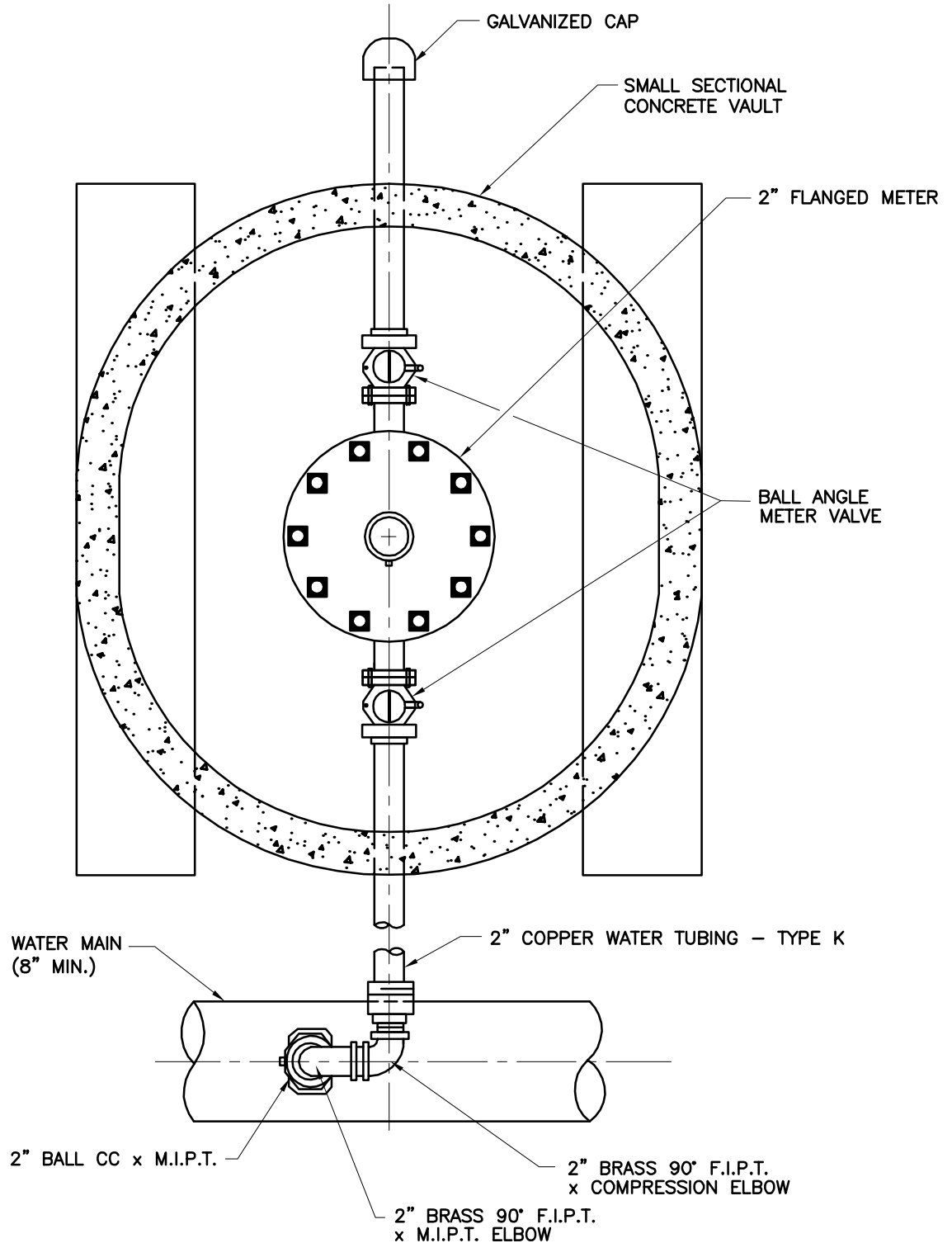
REVISED

3 / 2008

STANDARD NO.
BC 840.03

SCALE : NONE

SHEET 1 OF 2



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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION OF
 2" WATER SUPPLY SERVICE
 (2" METER) FOR
 8" MAIN AND LARGER

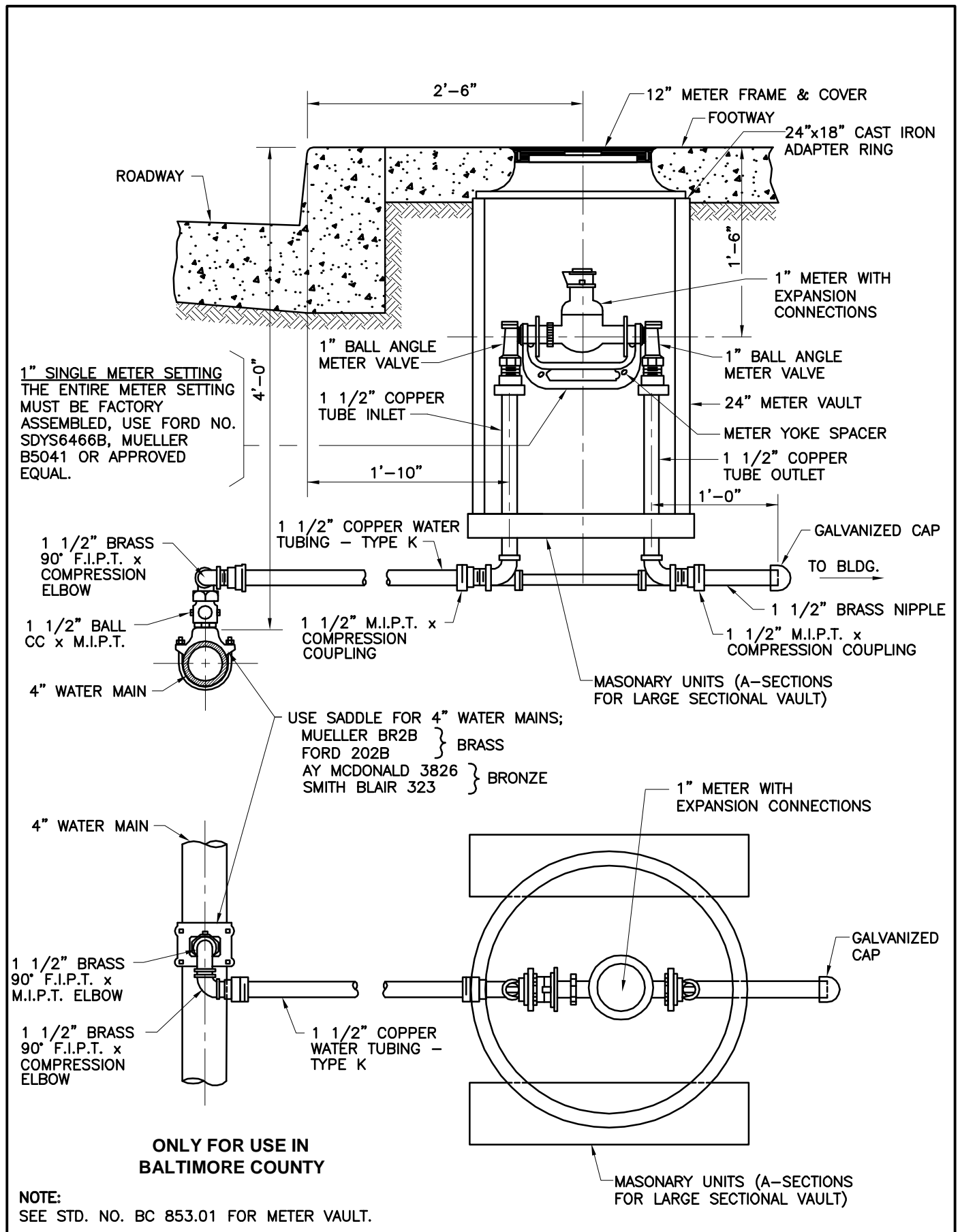
ISSUED	REVISED	REVISED
3 / 2008		


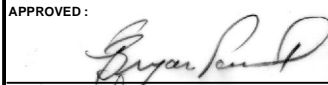
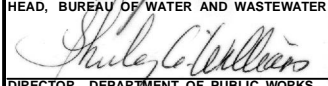
3 / 2008

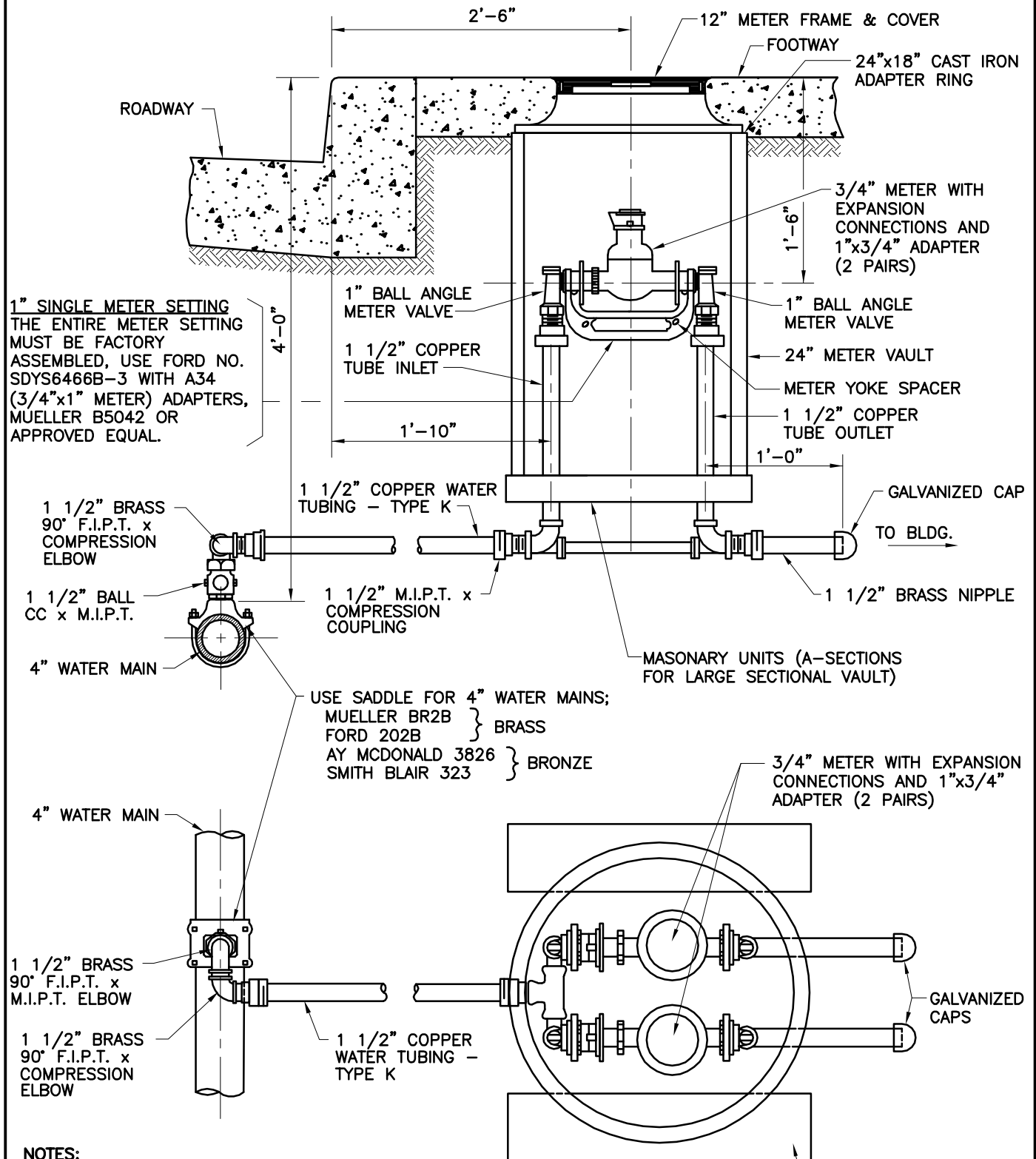
STANDARD NO.
 BC 840.03

SCALE : NONE

SHEET 2 OF 2



	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD INSTALLATION FOR FIRE PROTECTION 1 1/2" WATER SUPPLY SERVICE (1" METER) FOR 4" MAIN	STANDARD NO. BC 841.02		
			SCALE : NONE		SHEET 1 OF 1



NOTES:

1. SEE STD. NO. BC 853.01 FOR METER VAULT.
2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.

MASONRY UNITS (A-SECTIONS FOR LARGE SECTIONAL VAULT)

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BALTIMORE COUNTY**



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[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

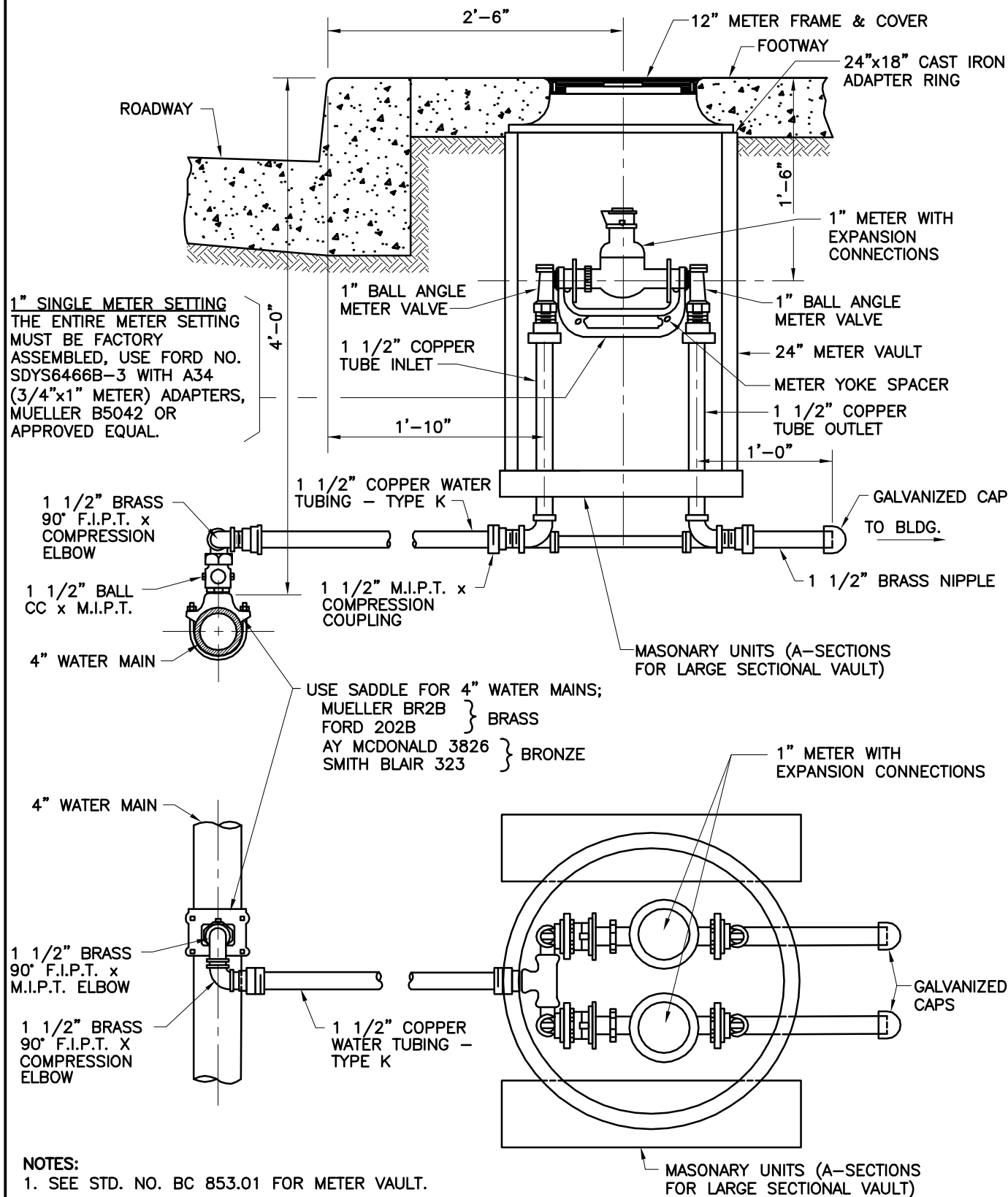
STANDARD INSTALLATION
FOR FIRE PROTECTION
1 1/2" TWIN WATER SUPPLY SERVICES
(3/4" METERS) FOR 4" MAIN

ISSUED	REVISED	REVISED
3 / 2008		

**STANDARD NO.
BC 841.03**

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. SEE STD. NO. BC 853.01 FOR METER VAULT.
2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.

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BALTIMORE COUNTY**



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

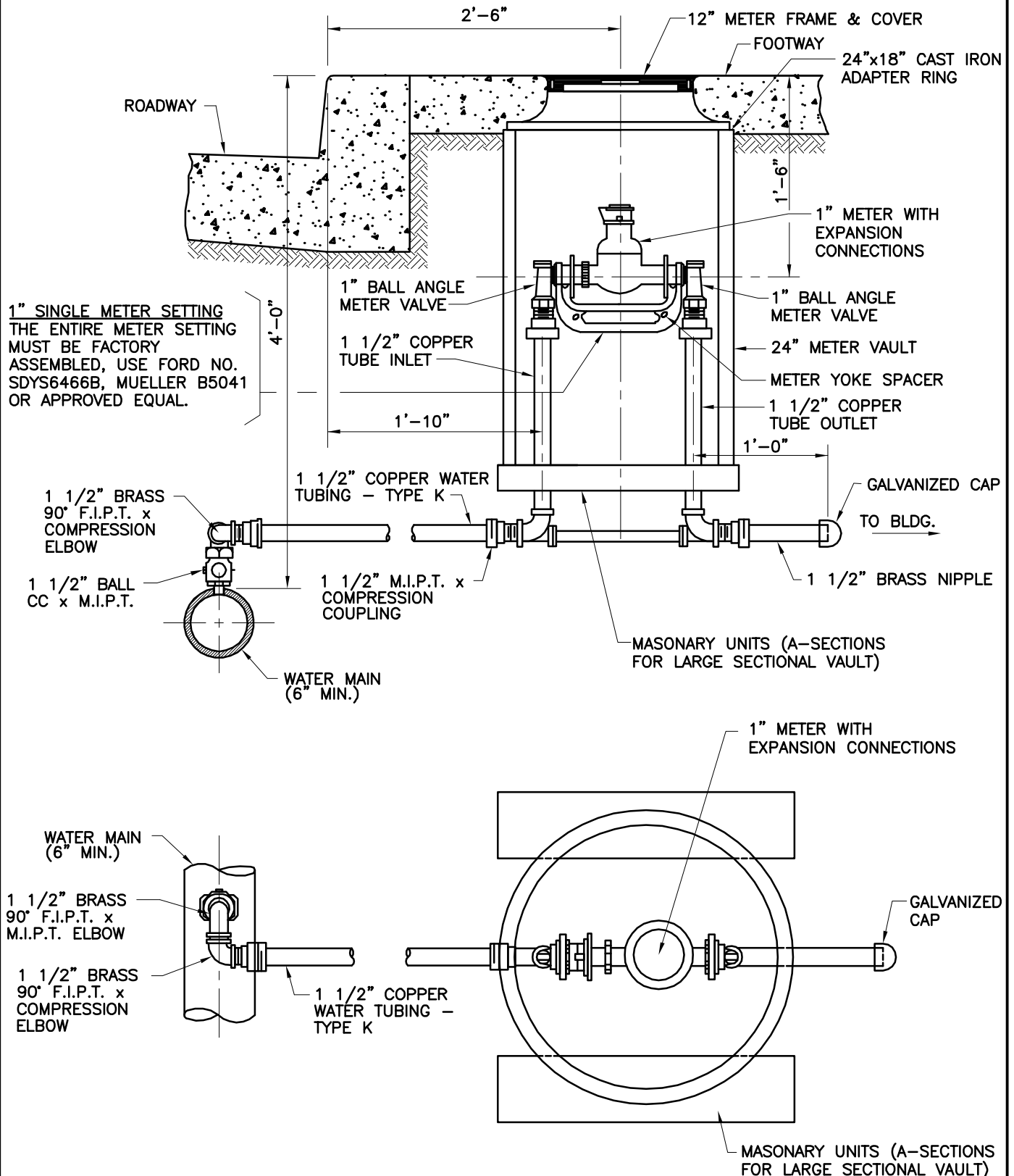
STANDARD INSTALLATION
FOR FIRE PROTECTION
1 1/2" TWIN WATER SUPPLY SERVICES
(1" METERS) FOR 4" MAIN

ISSUED	REVISED	REVISED
3 / 2008		

**STANDARD NO.
BC 841.04**

SCALE : NONE

SHEET 1 OF 1



NOTE:

SEE STD. NO. BC 853.01 FOR METER VAULT.



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
FOR FIRE PROTECTION
1 1/2" WATER SUPPLY SERVICE
(1" METER) FOR 6" MAIN AND LARGER

ISSUED

REVISED

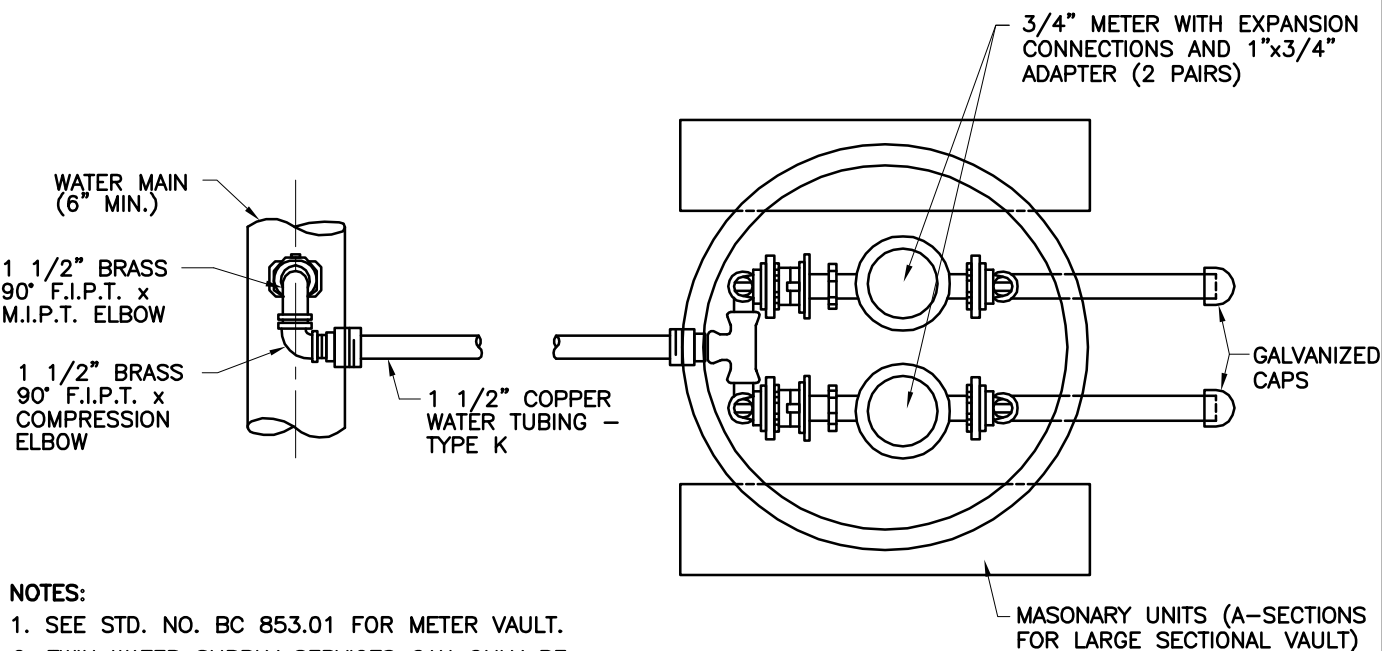
REVISED

3 / 2008

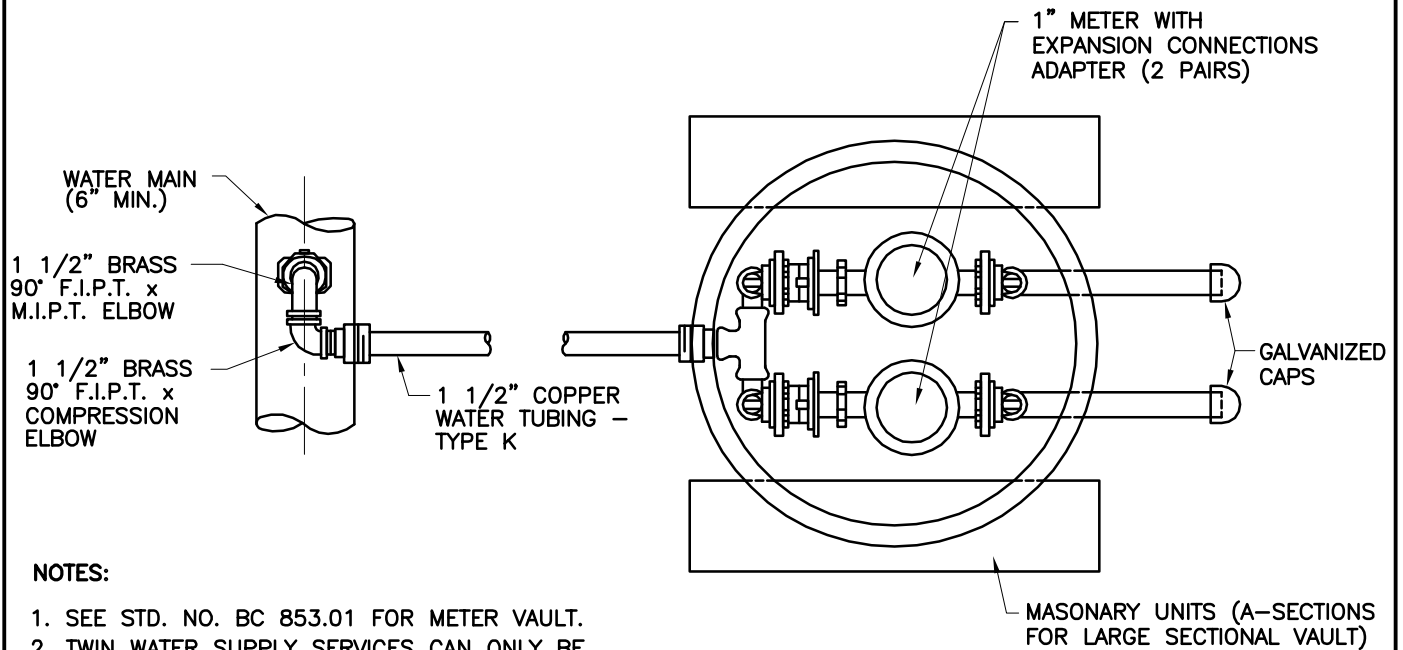
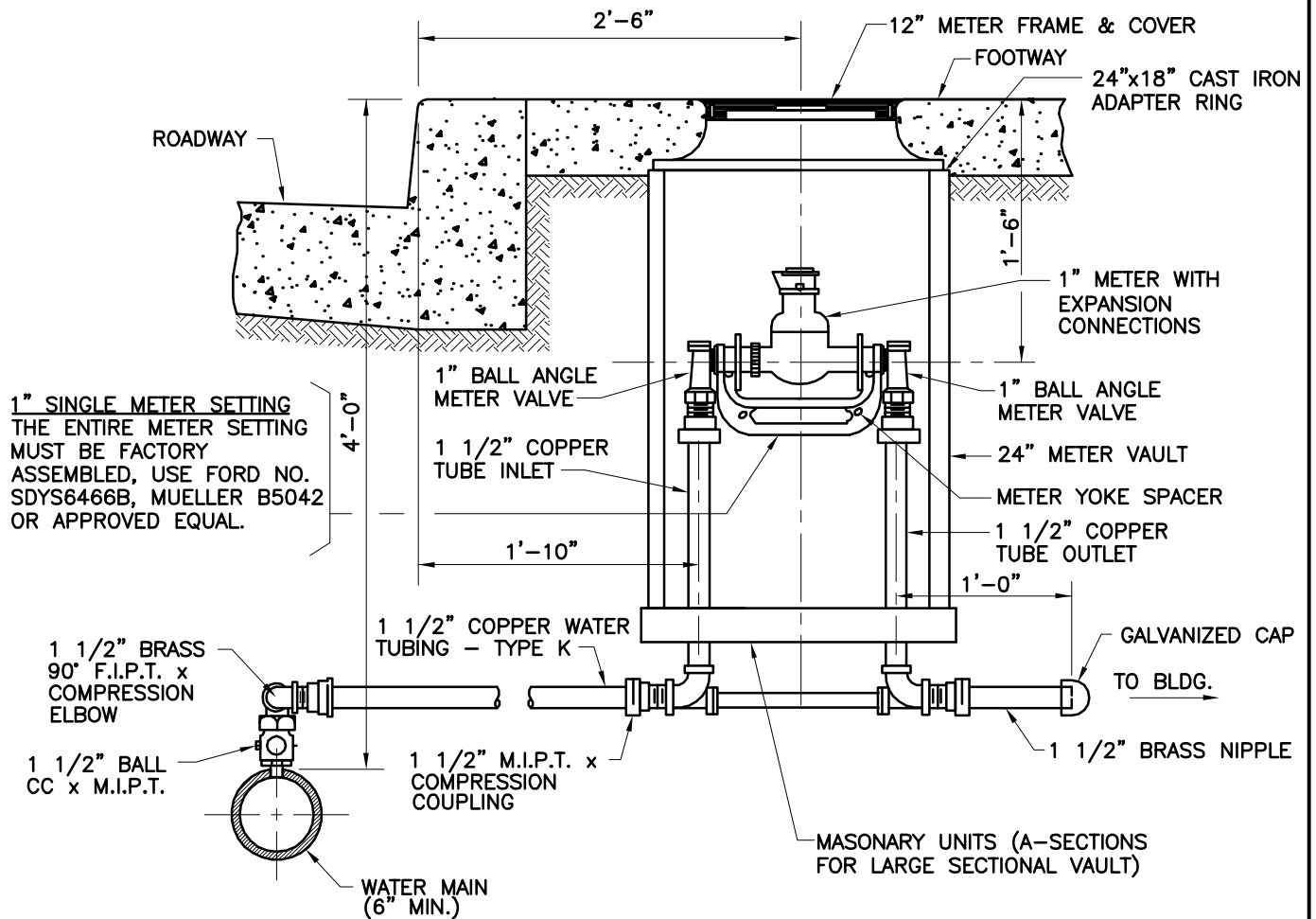
STANDARD NO.
BC 841.06

SCALE : NONE

SHEET 1 OF 1



SHEET 1 OF 1



NOTES:

1. SEE STD. NO. BC 853.01 FOR METER VAULT.
2. TWIN WATER SUPPLY SERVICES CAN ONLY BE USED FOR PROPERTIES WITH ATTACHED BUILDINGS - SUCH AS TOWN HOMES OR SEMI-DETACHED HOUSES.



APPROVED :

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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
FOR FIRE PROTECTION
1 1/2" TWIN WATER SUPPLY SERVICES
(1" METERS) FOR 6" MAIN AND LARGER

ISSUED

REVISED

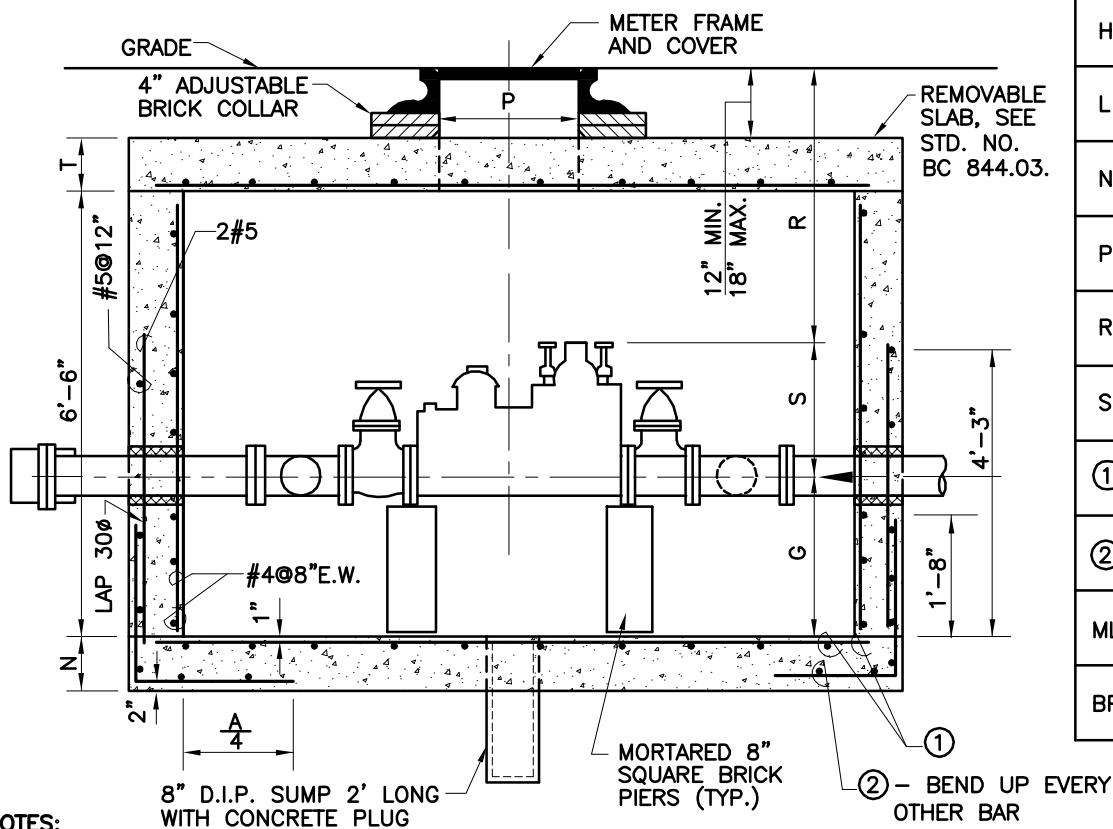
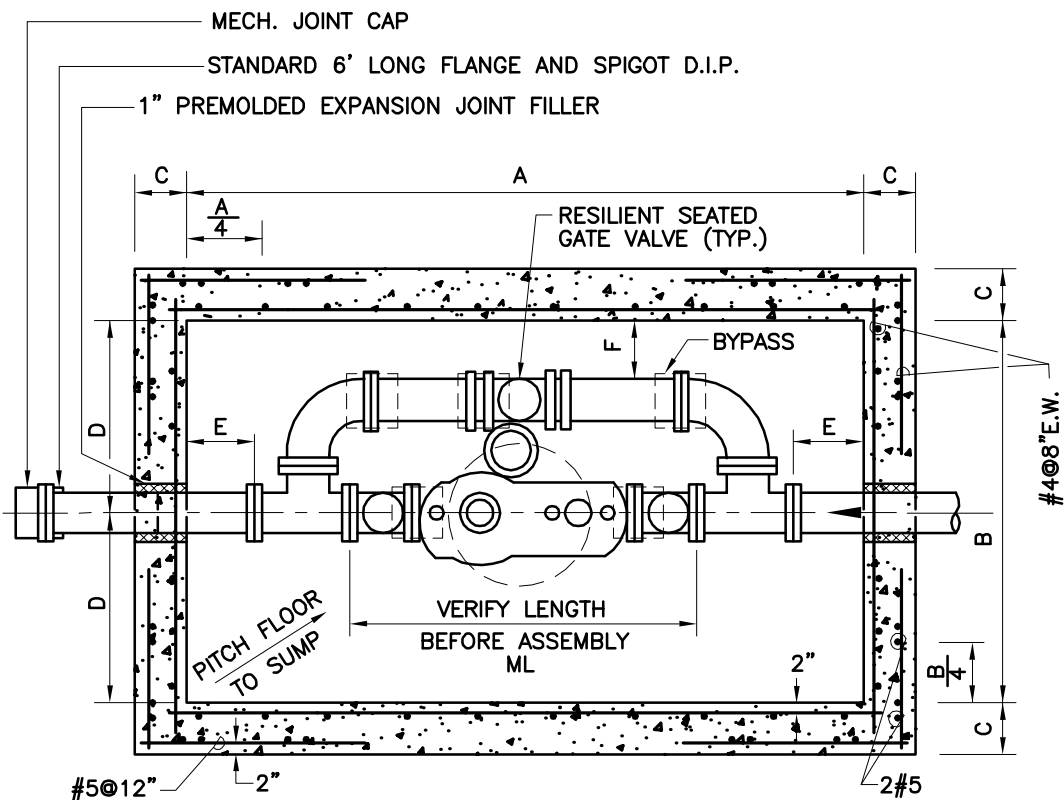
REVISED

3 / 2008

STANDARD NO.
BC 841.08

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. FOR CURB SETBACK, SEE STD. NO. BC 851.01.
2. CONCRETE SHALL BE MIX 3.

SIZE	4"	6"
A	8'-4"	9'-10"
B	4'-6"	5'-6"
C	9"	9"
D	2'-3"	2'-9"
E	13 1/2"	14 1/2"
F	11"	14 1/2"
G	2'-8"	2'-8"
H	3'-0"	3'-6"
L	4'-11"	5'-8"
N	6"	6"
P	24"	24"
R	4'-3" 4'-9"	3'-10" 4'-4"
S	1'-5"	1'-10"
①	#4@12	#4@12
②	#5@6	#5@6
ML	29"	36 1/2"
BP	4"	6"



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
OF 4" & 6"
WATER SUPPLY SERVICES
(4" & 6" METERS)

ISSUED

REVISED

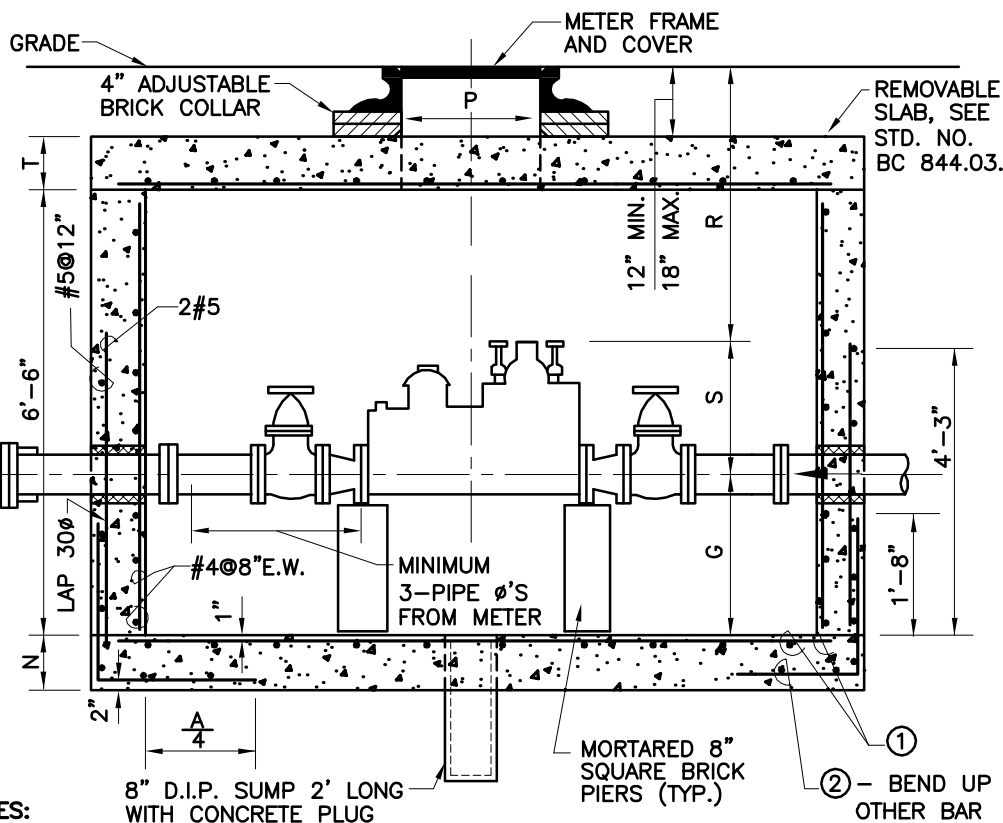
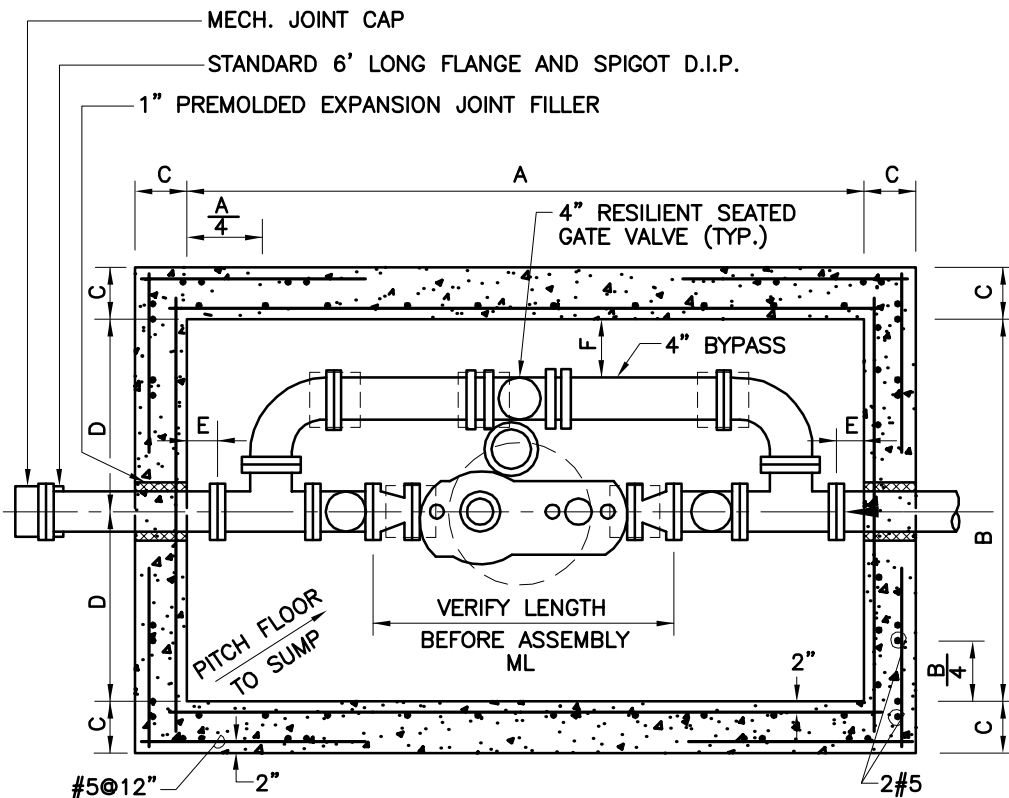
REVISED

3 / 2008

STANDARD NO.
BC 842.01

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. FOR CURB SETBACK, SEE STD. NO. BC 853.01.
2. CONCRETE SHALL BE MIX 3.

	4" SERV. 3" METER	6" SERV. 4" METER	6" SERV. 3" METER
A	8'-4"	9'-10"	9'-10"
B	4'-6"	5'-6"	5'-6"
C	9"	9"	9"
D	2'-3"	2'-9"	2'-9"
E	9"	9"	11 1/2"
F	11"	15 1/2"	15 1/2"
G	2'-8"	2'-8"	2'-8"
H	3'-0"	3'-6"	3'-6"
L	4'-11"	5'-8"	5'-8"
N	6"	6"	6"
P	24"	24"	24"
R	4'-6" 5'-0"	4'-3" 4'-9"	4'-6" 5'-0"
S	14"	17"	14"
①	#4@12	#4@12	#4@12
②	#5@6	#5@6	#5@6
ML	24"	29"	24"



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CITY OF BALTIMORE
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BUREAU OF WATER AND WASTEWATER

STANDARD INSTALLATION
OF 4" & 6"
WATER SUPPLY SERVICES
(3" & 4" METERS WITH REDUCERS)

ISSUED

REVISED

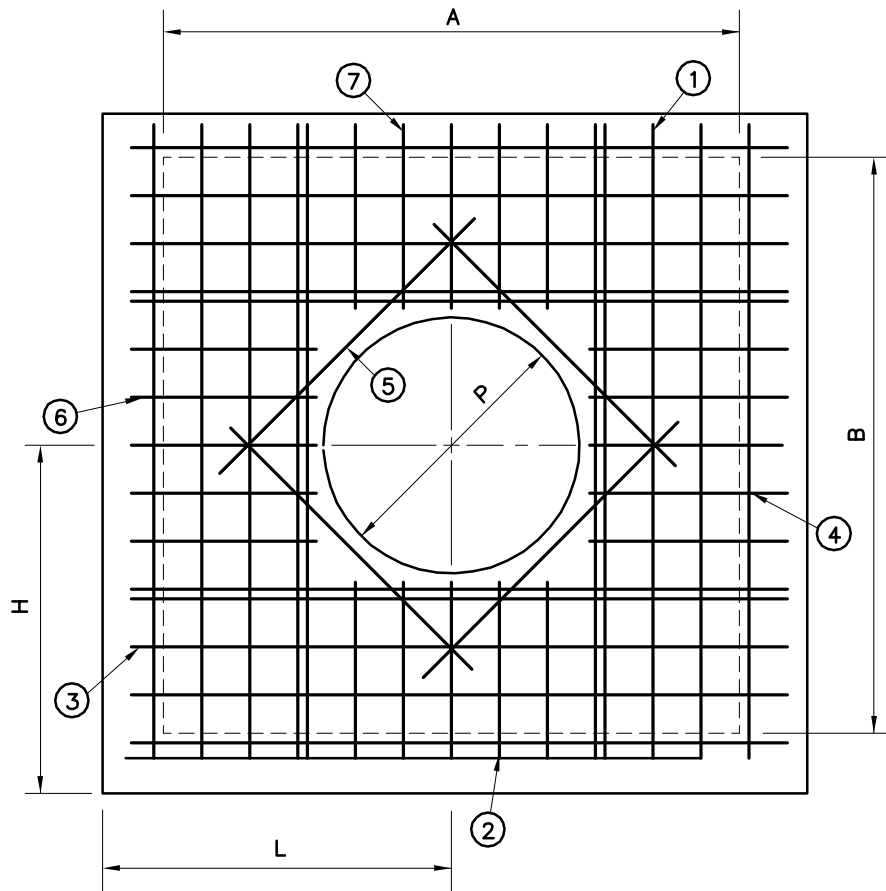
REVISED

3 / 2008

STANDARD NO.
BC 842.02

SCALE : NONE

SHEET 1 OF 1



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"	10"	#6@6"	18@5'-8"	3@1'-8"	10@9'-6"	3@3'-7"	4@3'-3"	3@3'-7"	3@1'-8"	5.18	1.09	1.80
6"	10"	#6@6"	20@6'-8"	3@2'-2"	12@11'-0"	3@4'-4"	4@3'-3"	3@4'-4"	3@2'-2"	6.08	1.47	2.45



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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

STANDARD VAULT
 FOR 4" & 6"
 WATER SUPPLY SERVICES

ISSUED

3 / 2008

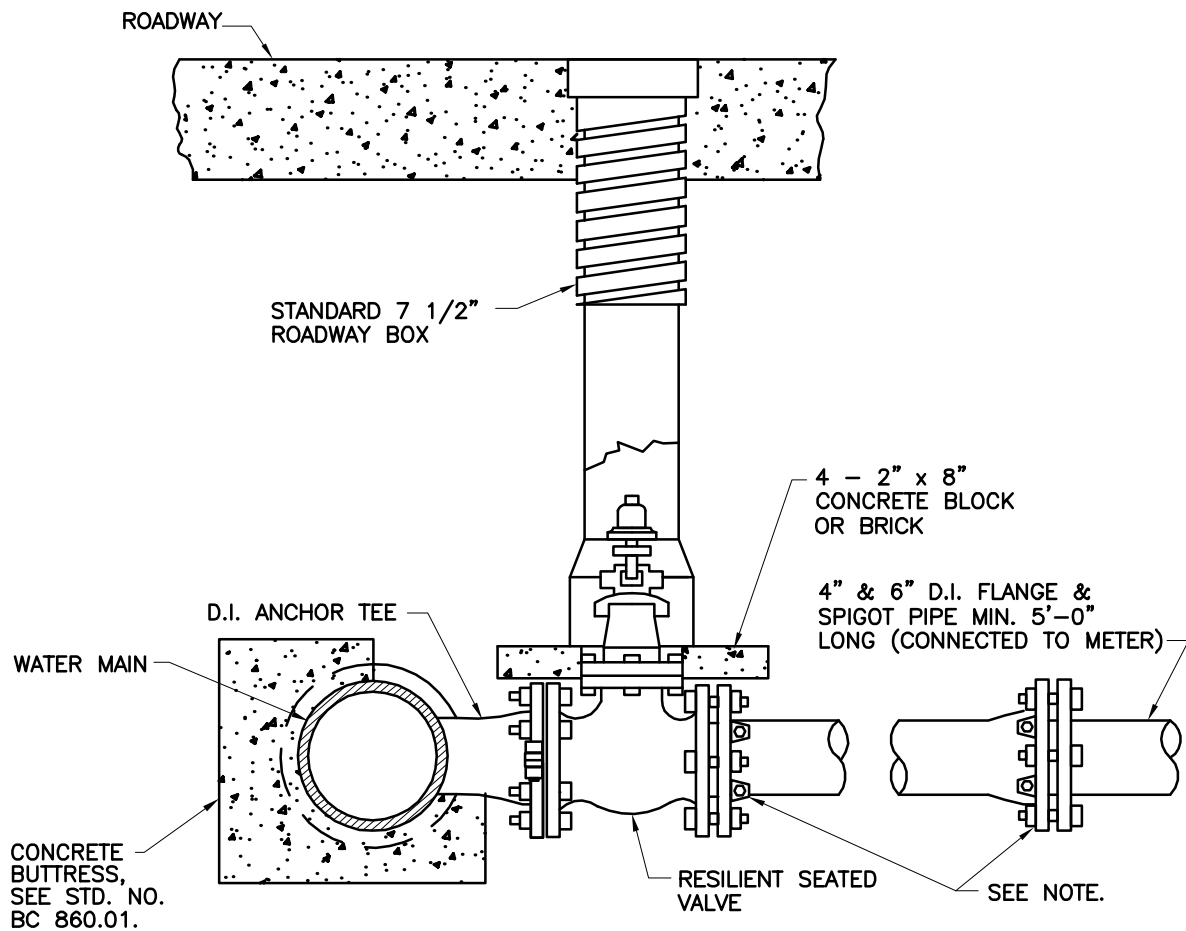
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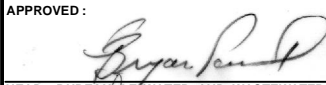

STANDARD NO.
 BC 842.03

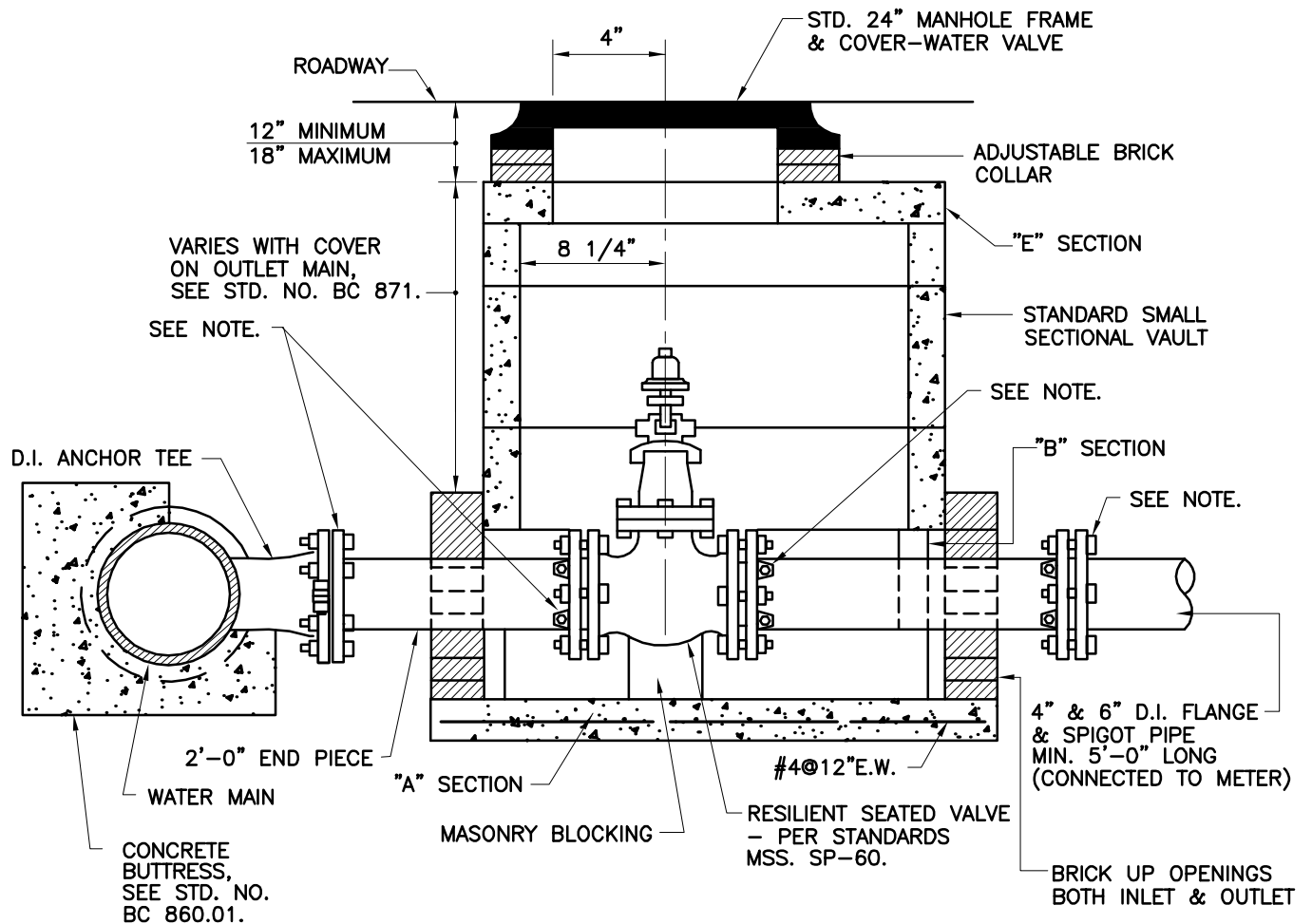
SCALE : NONE

SHEET 1 OF 1


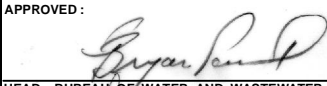
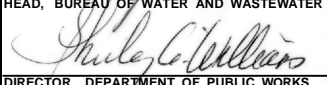


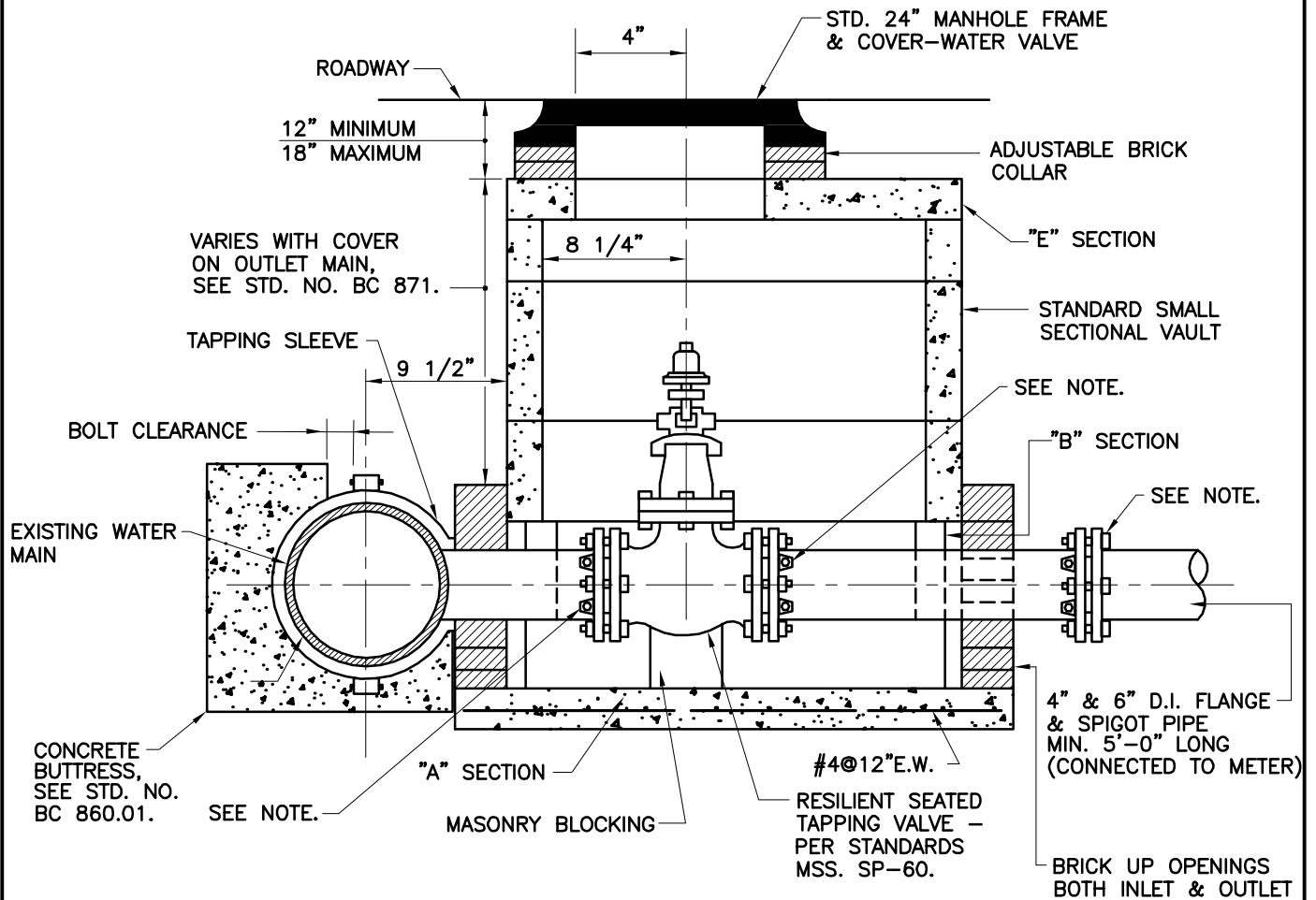
NOTE: ALL JOINTS MUST BE RESTRAINED BACK TO MAIN (ALL-THREAD RODS ARE NOT ACCEPTABLE).

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
			3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (3", 4", & 6" METERS) WITH TEE AND VALVE (ROADWAY BOX)	STANDARD NO. BC 843.01		
			SCALE : NONE		SHEET 1 OF 1


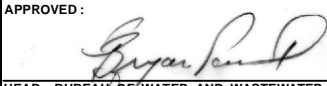
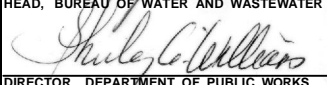


NOTE: ALL JOINTS MUST BE RESTRAINED BACK TO MAIN (ALL-THREAD RODS ARE NOT ACCEPTABLE).

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 843.02		
STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (3", 4", & 6" METERS) WITH TEE AND VALVE (SECTIONAL VAULT)			SCALE : NONE		
			SHEET 1 OF 1		


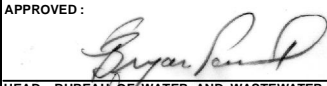
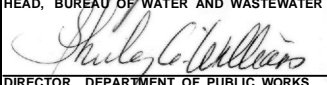


NOTE: ALL JOINTS MUST BE RESTRAINED BACK TO MAIN (ALL-THREAD RODS ARE NOT ACCEPTABLE).

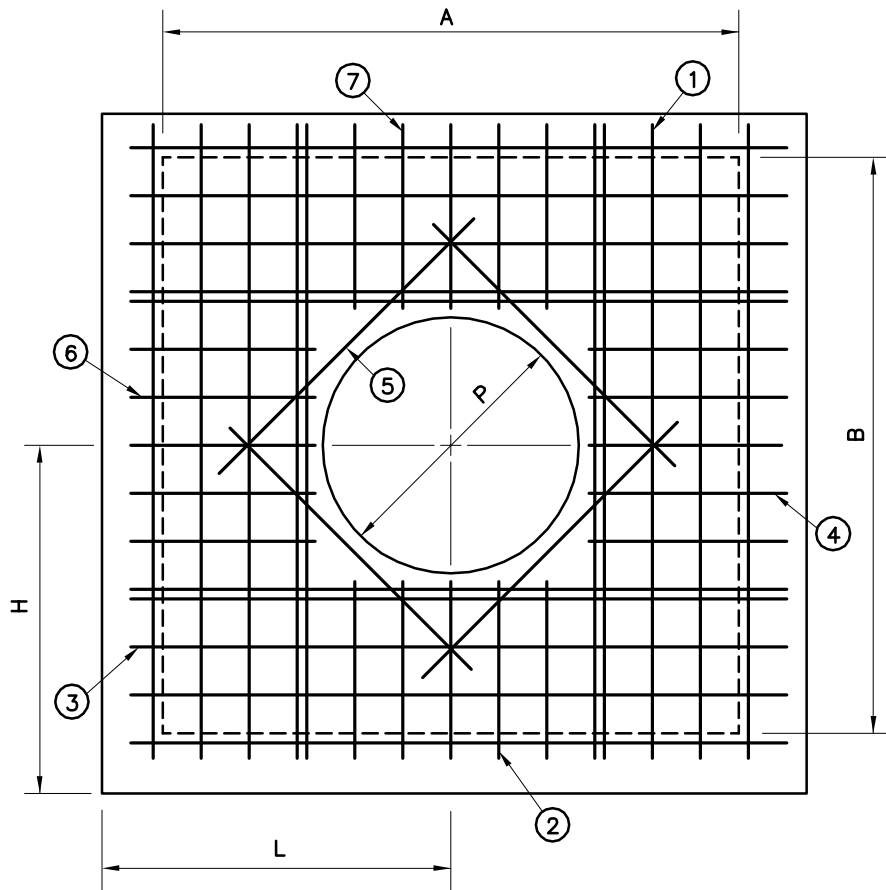
	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF 4" & 6" WATER SUPPLY SERVICES (3", 4", & 6" METERS) WITH TAPPING SLEEVE AND VALVE (SECTIONAL VAULT)	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 843.03		
			SCALE : NONE	SHEET 1 OF 1	

	4" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	6" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	8" DETECTOR CHECK W/6" DOM. METER AND 6" BYPASS	8" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	10" DETECTOR CHECK W/6" DOM. METER AND 6" BYPASS	10" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	6'-10"	6'-11 1/2"	8'-2"	7'-1 1/2"	8'-6"	7'-4 1/2"
B	6'-7 1/2"	7'-1"	8'-2"	7'-6"	8'-6"	7'-10"
C	9"	9"	9"	9"	9"	9"
D	2'-5"	2'-9"	3'-1"	3'-1"	3'-2"	3'-2"
D ₁	4'-2 1/2"	4'-4"	5'-1"	4'-5"	5'-4"	4'-8"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	9"	11"	11"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-2"	3'-6"	3'-10"	3'-10"	3'-11"	3'-11"
L	3'-3 1/4"	3'-9 1/4"	4'-1 1/4"	4'-1 1/4"	4'-10"	4'-10"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-7" 5'-1"	4'-6" 5'-0"	4'-4" 4'-10"	4'-3" 4'-9"	4'-0" 4'-6"	3'-11" 4'-5"
S	11 3/4"	1'-4 1/4"	1'-10 1/4"	1'-10 1/4"	2'-1 3/4"	2'-1 3/4"

NOTE: FOR 12" D.C. USE 10" D.C. VAULT WITH CORRESPONDING DOMESTIC METER AND BYPASS SIZES.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		STANDARD NO. BC 844.01		
			SCALE : NONE	SHEET 2 OF 3	

**REBAR SCHEDULE FOR
STANDARD VAULT FOR
4", 6", 8", & 10" DETECTOR CHECKS
WITH LARGE DOMESTIC METERS**



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"W/ 4"DOM.	9"	#6@6"	14@7'-9"	5@1'-7"	13@8'-0"	5@3'-6"	4@3'-3"	5@1'-8"	5@3'-4"	5.40	1.25	1.88
6"W/ 4"DOM.	9"	#6@6"	14@8'-3"	5@1'-11"	14@8'-1"	5@3'-1"	4@3'-3"	5@2'-2"	5@3'-6"	5.61	1.34	2.02
8"W/ 6"DOM.	10"	#6@5"	19@9'-4"	6@2'-3"	19@9'-4"	6@4'-0"	4@3'-3"	6@2'-6"	6@4'-3"	6.44	1.73	2.88
8"W/ 4"DOM.	9"	#6@5 1/2"	15@8'-8"	5@2'-3"	16@8'-2"	5@2'-10"	4@3'-3"	5@2'-6"	5@3'-7"	5.82	1.42	2.14
10"W/ 6"DOM.	10"	#6@5"	19@9'-8"	6@2'-4"	20@9'-8"	6@3'-7"	4@3'-3"	6@3'-3"	6@4'-6"	6.68	1.85	3.09
10"W/ 4"DOM.	9"	#6@5 1/2"	15@9'-0"	5@2'-4"	17@8'-6"	5@2'-6"	4@3'-3"	5@3'-3"	5@3'-10"	6.03	1.53	2.30



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ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8", & 10" DETECTOR CHECKS
WITH LARGE DOMESTIC METERS

ISSUED

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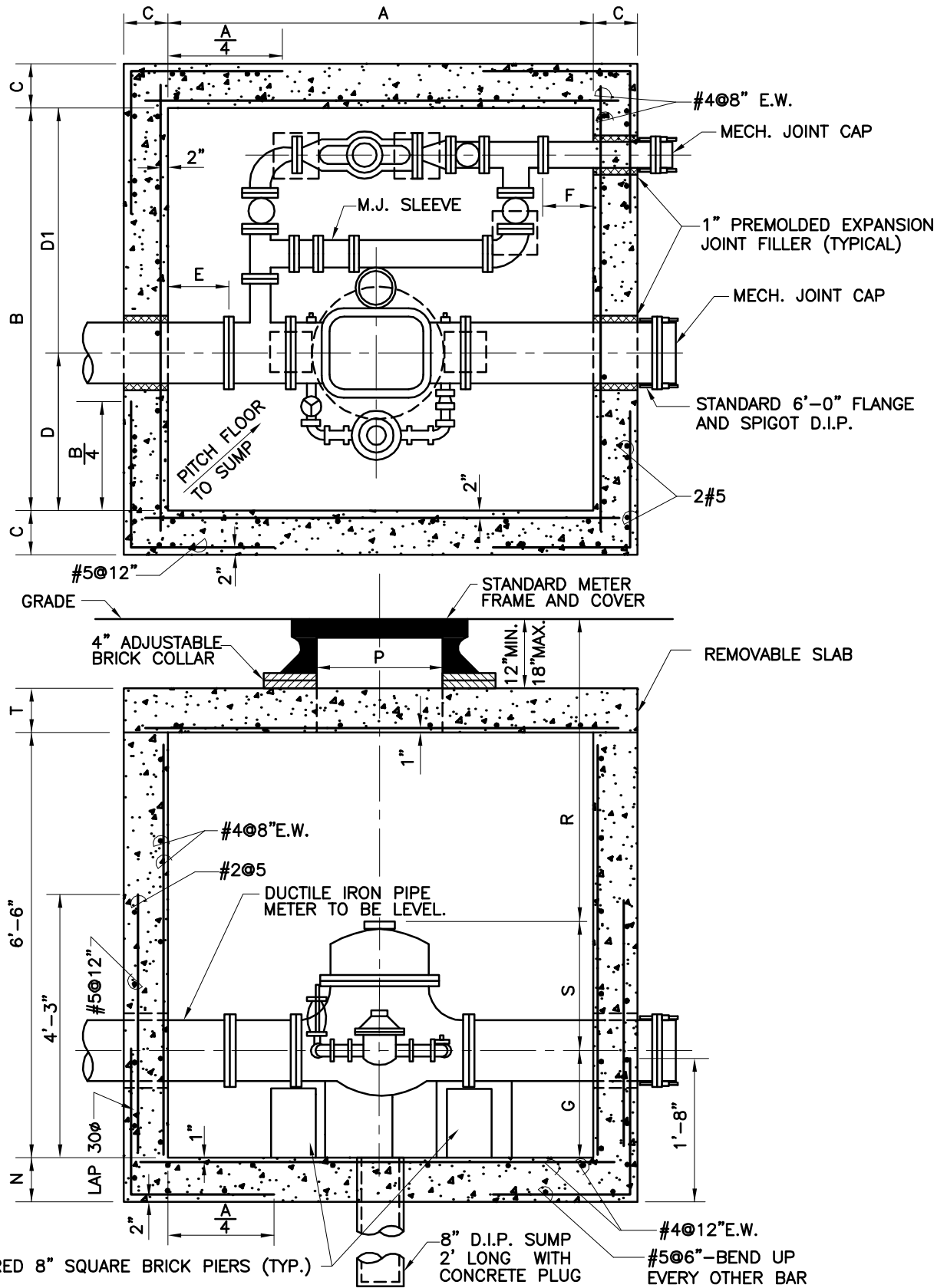
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STANDARD NO.
BC 844.01

SCALE : NONE

SHEET 3 OF 3



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BUREAU OF WATER AND WASTEWATER

STANDARD VAULT FOR
4", 6", 8", & 10" DETECTOR CHECKS WITH
REDUCED SIZE LARGE DOMESTIC METERS

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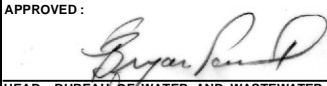
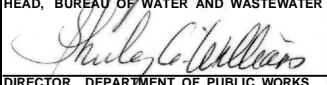
STANDARD NO.
BC 845.01

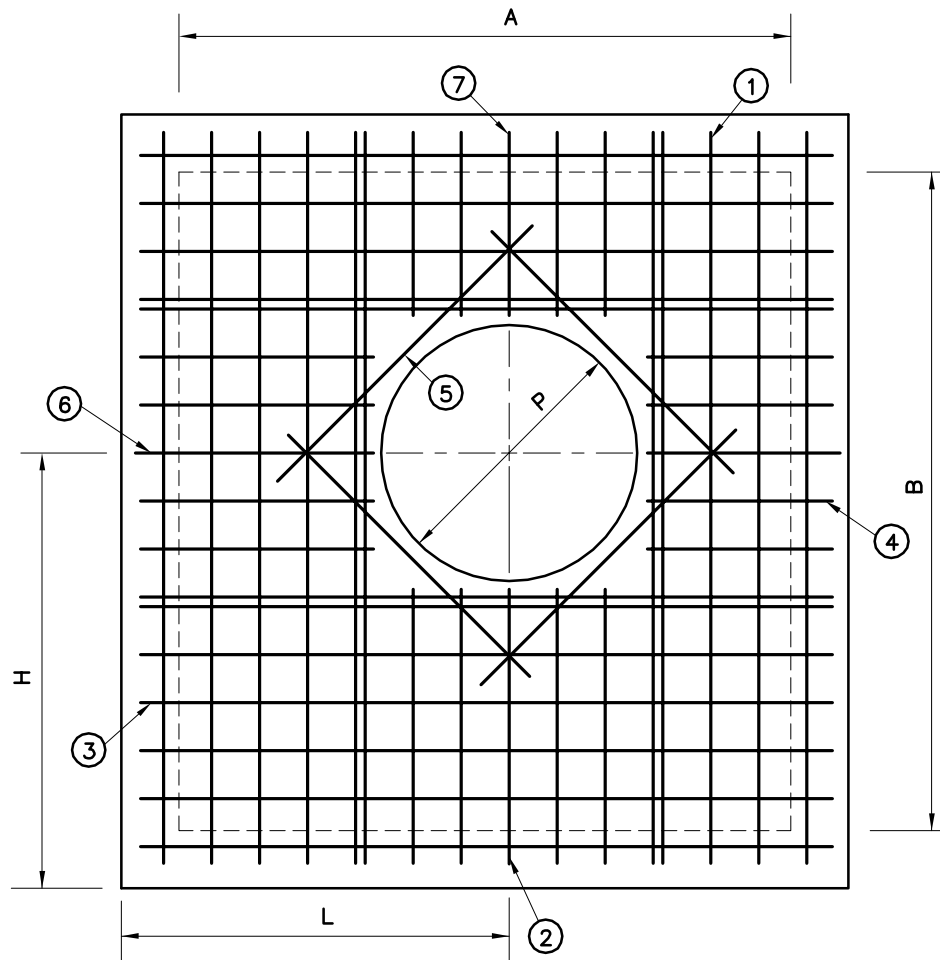
SCALE : NONE

SHEET 1 OF 3

	4" DETECTOR CHECK W/4" DOM. METER AND 4" BYPASS	6" DETECTOR CHECK W/3" DOM. METER AND 4" BYPASS	8" DETECTOR CHECK W/4" DOM. METER AND 6" BYPASS	8" DETECTOR CHECK W/3" DOM. METER AND 4" BYPASS	10" DETECTOR CHECK W/4" DOM. METER AND 6" BYPASS	10" DETECTOR CHECK W/3" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	7'-0"	7'-1 1/2"	8'-3 1/2"	7'-2 1/2"	8'-7 1/2"	7'-6 1/2"
B	6'-6 1/2"	7'-0"	8'-0"	7'-5"	8'-3"	7'-8"
C	9"	9"	9"	9"	9"	9"
D	2'-5"	2'-9"	3'-1"	3'-1"	3'-2"	3'-2"
D1	4'-1 1/2"	4'-3"	4'-11"	4'-4"	5'-1"	4'-6"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	9"	11"	11"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-2"	3'-6"	3'-10"	3'-10"	3'-11"	3'-11"
L	3'-3 1/4"	3'-9 1/4"	4'-1 1/4"	4'-1 1/4"	4'-10"	4'-10"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-7" 5'-1"	4'-6" 5'-0"	4'-4" 4'-10"	4'-3" 4'-9"	4'-0" 4'-6"	3'-11" 4'-5"
S	11 3/4"	1'-4 1/4"	1'-10 1/4"	1'-10 1/4"	2'-1 3/4"	2'-1 3/4"

NOTE: FOR 12" D.C. USE 10" D.C. VAULT WITH CORRESPONDING DOMESTIC METER AND BYPASS SIZES.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", & 10" DETECTOR CHECKS WITH REDUCED SIZE LARGE DOMESTIC METERS	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
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ROOF SLAB MATERIALS										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4" W/ 3" DOM	9"	#6@6"	14@7'-8"	5@1'-7"	13@8'-2"	5@3'-8"	4@3'-3"	5@1'-8"	5@3'-3"	5.43	1.27	1.91
6" W/ 3" DOM	9"	#6@6"	14@8'-2"	5@1'-11"	14@8'-3"	5@3'-3"	4@3'-3"	5@2'-2"	5@3'-5"	5.64	1.36	2.04
8" W/ 4" DOM	10"	#6@5"	19@9'-2"	6@2'-3"	19@9'-5"	6@4'-1"	4@3'-3"	6@2'-6"	6@4'-1"	6.42	1.72	2.87
8" W/ 3" DOM	9"	#6@5 1/2"	15@8'-7"	5@2'-3"	16@8'-4"	5@3'-0"	4@3'-3"	5@2'-6"	5@3'-6"	5.82	1.44	2.16
10" W/ 4" DOM	10"	#6@5"	19@9'-5"	6@2'-4"	20@9'-9"	6@3'-8"	4@3'-3"	6@3'-3"	6@4'-3"	6.64	1.83	3.05
10" W/ 3" DOM	9"	#6@5 1/2"	15@8'-10"	5@2'-4"	17@8'-8"	5@2'-7"	4@3'-3"	5@3'-3"	5@3'-8"	6.03	1.53	2.30



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CITY OF BALTIMORE
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ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8", & 10" DETECTOR CHECKS WITH
REDUCED SIZE LARGE DOMESTIC METERS

ISSUED

3 / 2008

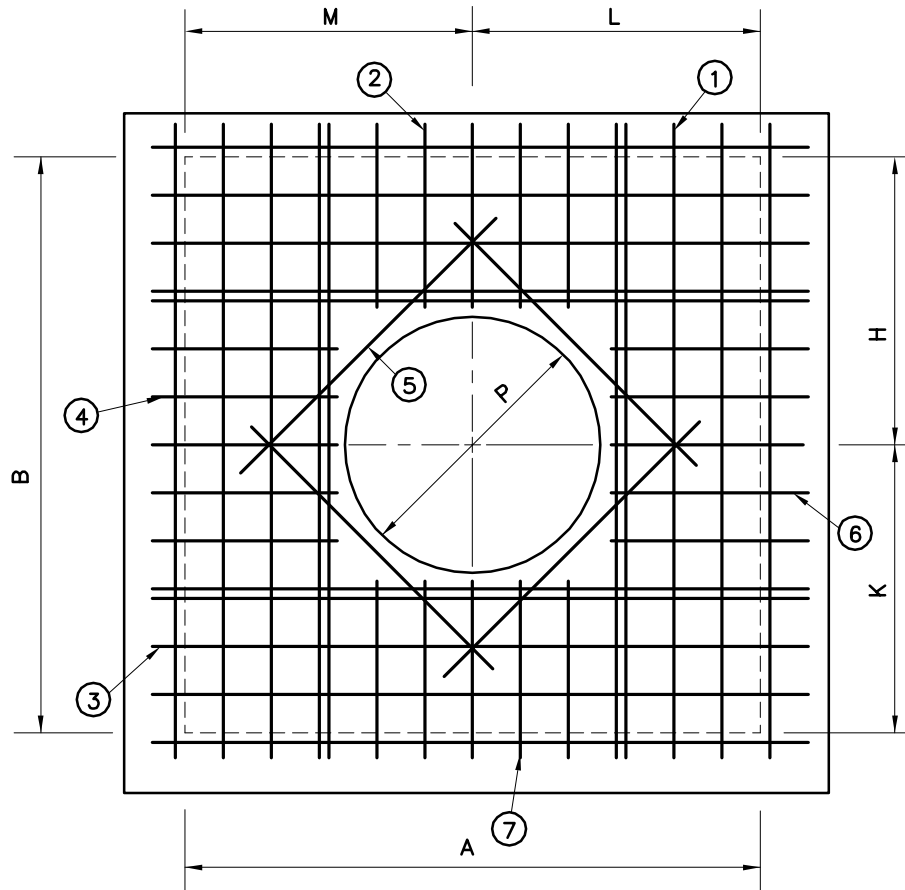
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STANDARD NO.
BC 845.01

SCALE : NONE

SHEET 3 OF 3



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"	8"	#6@7"	9@6'-9"	3@2'-6"	11@5'-5"	3@2'-1"	4@3'-3"	3@1'-6"	3@2'-6"	4.11	0.75	1.01
6"	8 1/2"	#6@6"	11@7'-8"	4@2'-8"	14@6'-5"	4@2'-4"	4@3'-3"	4@1'-9"	4@2'-8"	4.81	1.00	1.42
8"	9"	#6@6"	12@8'-8"	5@2'-11"	15@7'-1"	5@2'-4"	4@3'-3"	5@1'-11"	5@2'-11"	5.42	1.24	1.85
10"	10"	#6@6"	14@10'-2"	5@3'-8"	18@8'-4"	5@3'-3"	4@3'-3"	5@2'-3"	5@3'-8"	6.38	1.69	2.81



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ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8", 10", & 12" F.M. METERS
WITH SMALL DOMESTIC METERS

ISSUED

3 / 2008

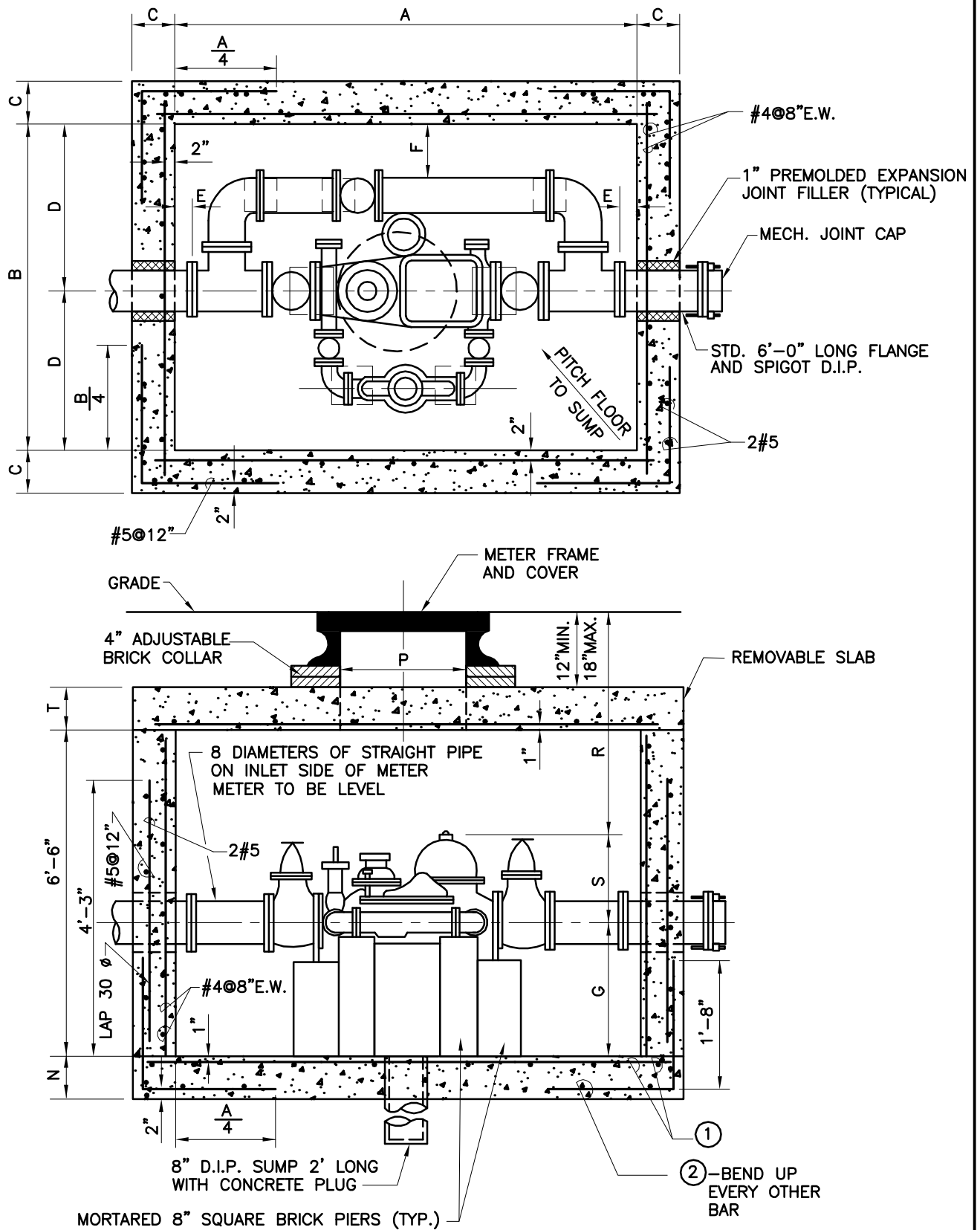
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STANDARD NO.
BC 846.01

SCALE : NONE

SHEET 2 OF 2



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 DEPARTMENT OF PUBLIC WORKS
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STANDARD VAULT FOR
 4", 6", 8", 10", & 12" F.M. METERS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 847.01		
SCALE : NONE		SHEET 1 OF 3

	4" F.M. WITH BYPASS	6" F.M. WITH BYPASS	8" F.M. WITH BYPASS	10" F.M. WITH BYPASS	12" F.M. WITH BYPASS
SIZE	4"	6"	8"	10"	12"
A	7'-11"	9'-8"	10'-10"	13'-0"	13'-6"
B	5'-6"	6'-0"	6'-11"	8'-6"	8'-6"
C	9"	9"	9"	9"	9"
D	2'-9"	3'-0"	3'-5 1/2"	4'-3"	4'-3"
E	9"	9"	9"	9"	9"
F	1'-3"	1'-2"	1'-4"	1'-8"	1'-7"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"
H	3'-6"	3'-9"	4'-2 1/2"	5'-0"	5'-0"
L	4'-8 1/2"	5'-7"	6'-2"	7'-3"	7'-6"
N	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"
R	4'-5" 4'-11"	4'-5" 4'-11"	4'-4" 4'-10"	3'-8" 4'-2"	3'-8" 4'-2"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	2'-6"	2'-6"
①	#4@12"E.W.	#4@12"E.W.	#4@12"E.W.	#4@9"E.W.	#4@9"E.W.
②	#5@6"	#5@6"	#5@6"	#5@4 1/2"	#5@4 1/2"



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REBAR SCHEDULE FOR
STANDARD VAULT FOR
4", 6", 8", 10", & 12" F.M. METERS

ISSUED

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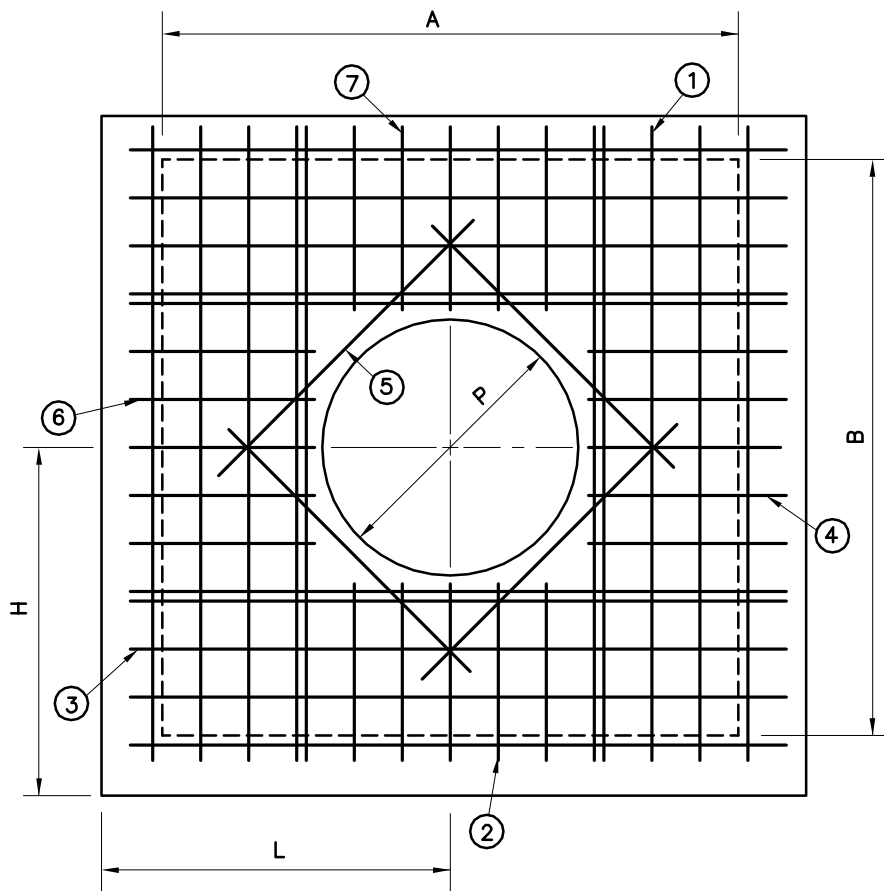
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STANDARD NO.
BC 847.01

SCALE : NONE

SHEET 2 OF 3



ROOF SLAB MATERIAL										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4"	10"	#6@7"	13@6'-8"	5@1'-11"	9@9'-1"	5@3'-1"	4@3'-3"	5@3'-1"	5@1'-11"	5.42	1.22	2.03
6"	10"	#6@6 1/2"	17@7'-2"	5@2'-2"	11@10'-10"	5@4'-0"	4@3'-3"	5@4'-0"	5@2'-2"	6.20	1.55	2.58
8"	10"	#6@5"	25@8'-1"	6@2'-7 1/2"	17@12'-0"	6@4'-7"	4@3'-3"	6@4'-7"	6@2'-7 1/2"	6.95	1.92	3.20
10"	10"	#6@4 1/2"	33@9'-8"	7@3'-5"	23@14'-2"	7@5'-8"	4@3'-3"	7@5'-8"	7@3'-5"	8.37	2.69	4.48
12"	10"	#6@4 1/2"	33@9'-8"	7@3'-5"	23@14'-8"	7@5'-11"	4@3'-3"	7@5'-11"	7@3'-5"	8.49	2.78	4.63



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ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8", 10", & 12" F.M. METERS

ISSUED

3 / 2008

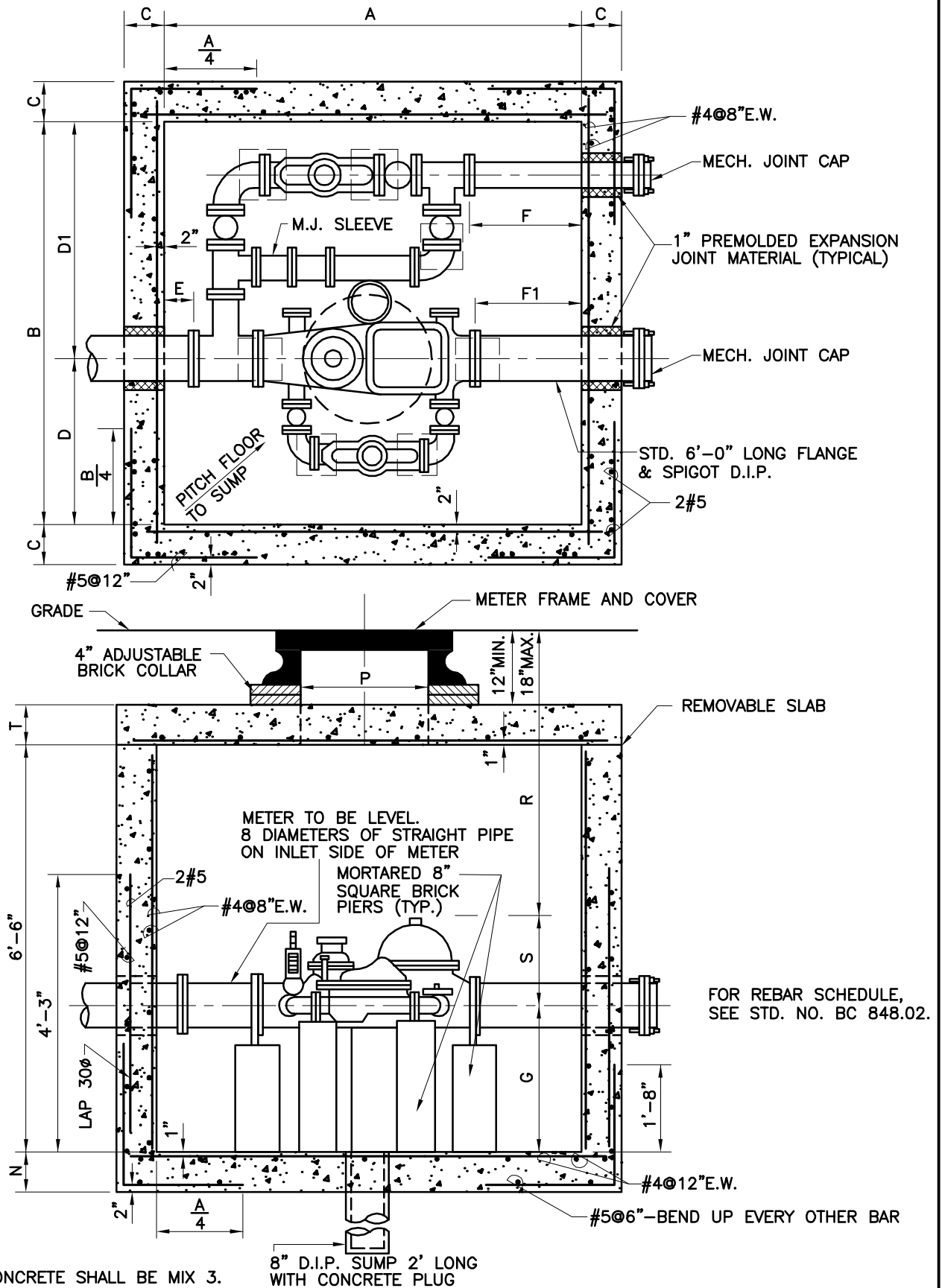
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STANDARD NO.
BC 847.01

SCALE : NONE

SHEET 3 OF 3



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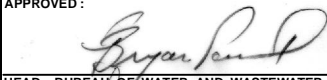
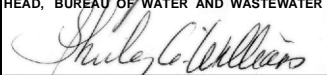
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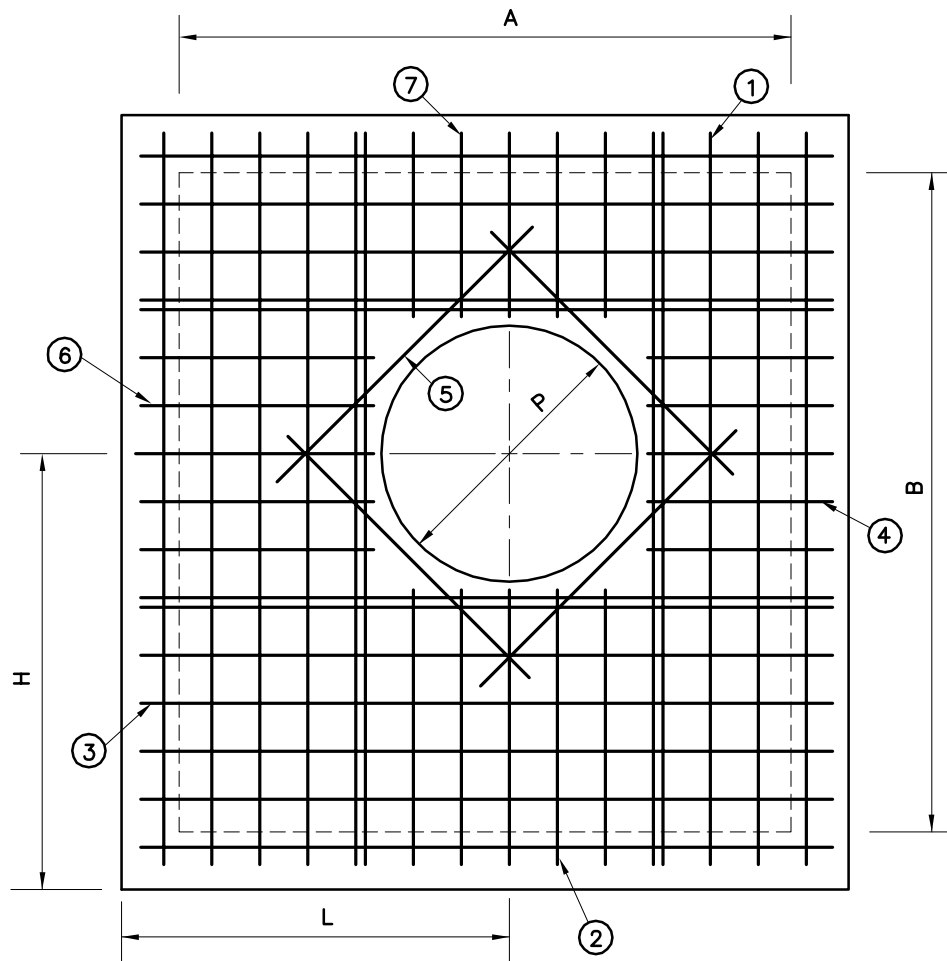
STANDARD VAULT FOR
 4", 6", 8", 10", & 12" F.M. METERS
 WITH LARGE DOMESTIC METERS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 848.01		
SCALE : NONE		SHEET 1 OF 3

	4" F.M. WITH 4" DOM. METER AND 4" BYPASS	6" F.M. WITH 4" DOM. METER AND 4" BYPASS	8" F.M. WITH 6" DOM. METER AND 6" BYPASS	8" F.M. WITH 4" DOM. METER AND 4" BYPASS	10" F.M. WITH 6" DOM. METER AND 6" BYPASS	10" F.M. WITH 4" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	6'-10"	6'-11 1/2"	8'-2"	7'-5"	9'-2"	9'-2"
B	7'-10"	7'-7"	8'-9 1/2"	8'-1 1/2"	9'-9"	9'-1"
C	9"	9"	9"	9"	9"	9"
D	2'-10"	3'-3"	3'-9"	3'-9"	4'-6"	4'-6"
D1	4'-2"	4'-4"	5'-1 1/2"	4'-4 1/2"	5'-3"	4'-7"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	—	—	—
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-7"	4'-0"	4'-6"	4'-6"	5'-3"	5'-3"
L	3'-11 1/2"	4'-8 1/2"	5'-2 1/2"	5'-2 1/2"	6'-2"	6'-2"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-4" 4'-10"	4'-4" 4'-10"	4'-4" 4'-10"	4'-4" 4'-10"	3'-8" 4'-2"	3'-8" 4'-2"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	1'-9 1/2"	2'-6"	2'-6"
F1	—	—	—	9"	11"	11"

NOTE: FOR 12" F.M. USE 10" F.M. VAULT WITH CORRESPONDING DOMESTIC METERS & BYPASS SIZES.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS WITH LARGE DOMESTIC METERS	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 848.01 SCALE : NONE SHEET 2 OF 3		



ROOF SLAB MATERIALS										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4" W/ 3" DOM	9"	#6@6"	14@8'-2"	5@2'-0"	14@8'-0"	5@2'-9"	4@3'-3"	5@2'-4"	5@3'-4"	5.54	1.31	1.97
6" W/ 3" DOM	9"	#6@5 1/2"	15@8'-9"	5@2'-5"	16@8'-1"	5@2'-2"	4@3'-3"	5@3'-1"	5@3'-6"	5.79	1.42	2.13
8" W/ 6" DOM	10"	#6@5"	19@9'-11"	6@2'-11"	20@9'-4"	6@2'-10"	4@3'-3"	6@3'-7"	6@4'-2"	6.67	1.84	3.07
8" W/ 3" DOM	10"	#6@6"	15@9'-3"	5@2'-11"	16@8'-7"	5@2'-1"	4@3'-3"	5@3'-7"	5@3'-6"	6.15	1.59	2.65
10" W/ 6" DOM	10"	#6@4 1/2"	23@10'-11"	7@3'-8"	25@10'-4"	7@2'-11"	4@3'-3"	7@4'-7"	7@4'-5"	7.37	2.22	3.70
10" W/ 3" DOM	10"	#6@4 1/2"	23@10'-3"	7@3'-8"	23@10'-4"	7@2'-11"	4@3'-3"	7@4'-7"	7@3'-9"	7.13	2.09	3.48



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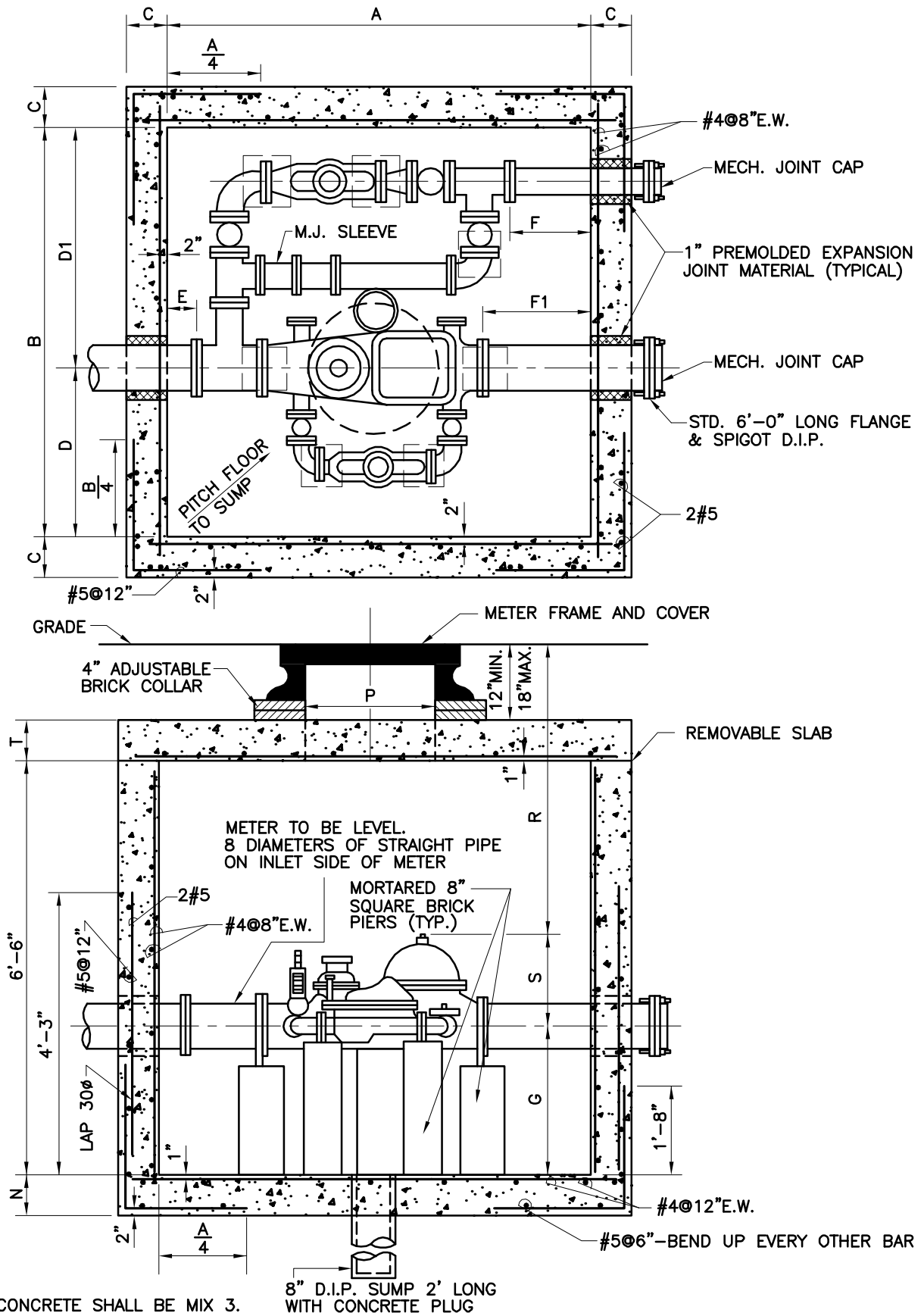
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ROOF SLAB AND CONCRETE QUANTITIES
 FOR STANDARD VAULT FOR
 4", 6", 8", 10", & 12" F.M. METERS
 WITH LARGE DOMESTIC METERS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 848.01		
SCALE : NONE	SHEET 3 OF 3	



NOTE: CONCRETE SHALL BE MIX 3.



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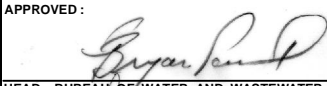
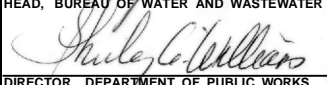
CITY OF BALTIMORE
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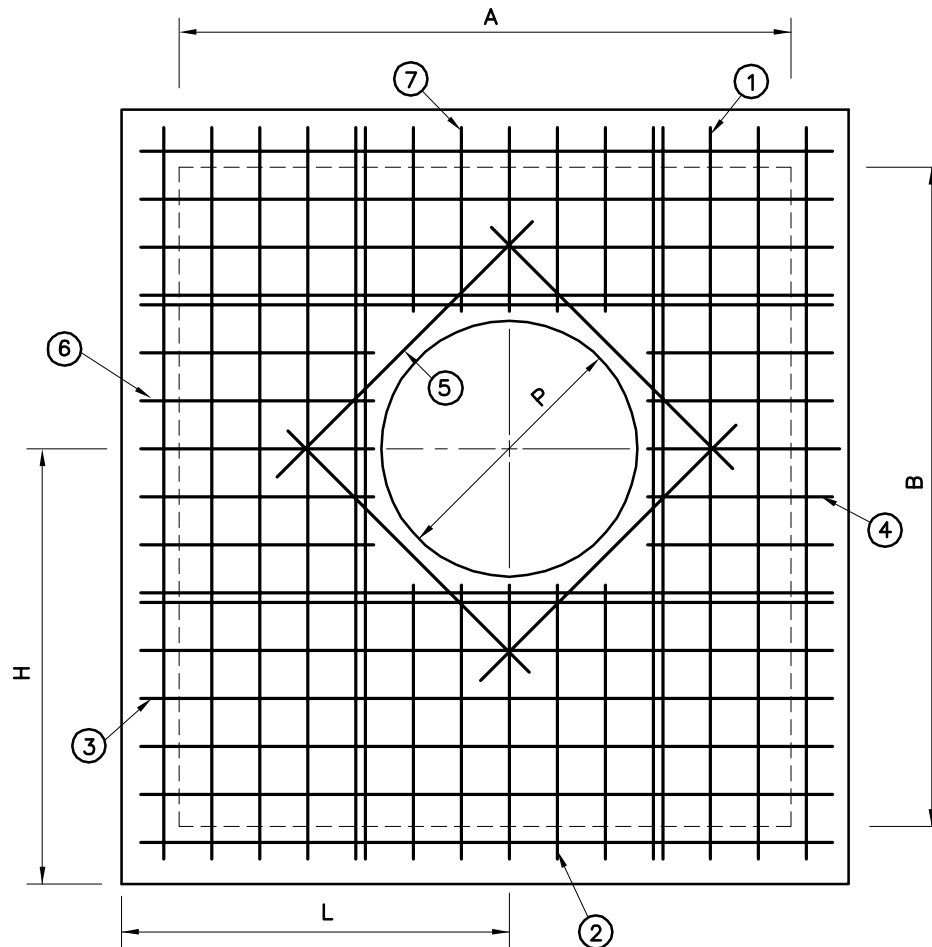
STANDARD VAULT FOR
 4", 6", 8", 10", & 12" F.M. METERS WITH
 REDUCED SIZE LARGE DOMESTIC METERS

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 849.01		
SCALE: NONE		SHEET 1 OF 3

	4" F.M. WITH 3" DOM. METER AND 4" BYPASS	6" F.M. WITH 3" DOM. METER AND 4" BYPASS	8" F.M. WITH 4" DOM. METER AND 6" BYPASS	8" F.M. WITH 3" DOM. METER AND 4" BYPASS	10" F.M. WITH 4" DOM. METER AND 6" BYPASS	10" F.M. WITH 3" DOM. METER AND 4" BYPASS
SIZE	4"	6"	8"	8"	10"	10"
A	7'-0"	7'-1 1/2"	8'-3 1/2"	7'-5"	9'-2"	9'-2"
B	6'-11"	7'-6"	8'-7 1/2"	8'-1 1/2"	9'-7"	9'-0"
C	9"	9"	9"	9"	9"	9"
D	2'-10"	3'-3"	3'-9"	3'-9"	4'-6"	4'-6"
D1	4'-1"	4'-3"	4'-10 1/2"	4'-3 1/2"	5'-1"	4'-6"
E	9"	9"	9"	9"	9"	9"
F	9"	9"	9"	—	—	—
F1	—	—	—	9"	11"	11"
G	2'-8"	2'-5"	2'-2"	2'-2"	2'-2"	2'-2"
H	3'-7"	4'-0"	4'-6"	4'-6"	5'-3"	5'-3"
L	3'-11 1/2"	4'-8 1/2"	5'-2 1/2"	5'-2 1/2"	6'-2"	6'-2"
N	6"	6"	6"	6"	6"	6"
P	30"	30"	30"	30"	30"	30"
R	4'-4" 4'-10"	4'-4" 4'-10"	4'-4" 4'-10"	4'-3" 4'-9"	3'-8" 4'-2"	3'-7" 4'-1"
S	1'-2 1/2"	1'-5 1/2"	1'-9 1/2"	1'-9 1/2"	2'-6"	2'-6"

NOTE: FOR 12" F.M. USE 10" F.M. VAULT WITH CORRESPONDING DOMESTIC METERS & BYPASS SIZES.

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER REBAR SCHEDULE FOR STANDARD VAULT FOR 4", 6", 8", 10", & 12" F.M. METERS WITH REDUCED SIZE LARGE DOMESTIC METERS	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 849.01 SCALE : NONE SHEET 2 OF 3		



ROOF SLAB MATERIALS										CONCRETE QUANTITY (CUBIC YARDS)		
SIZE	T	REBARS	STRAIGHT BARS							WALLS	FLOOR	ROOF SLAB
			①	②	③	④	⑤	⑥	⑦			
4" W/ 3" DOM	9"	#6@6"	14@8'-1"	5@2'-0"	14@8'-2"	5@2'-11"	4@3'-3"	5@2'-4"	5@3'-3"	5.57	1.32	1.98
6" W/ 3" DOM	9"	#6@6"	15@8'-8"	5@2'-5"	15@8'-3"	5@2'-4"	4@3'-3"	5@3'-1"	5@3'-5"	5.82	1.44	2.16
8" W/ 4" DOM	10"	#6@5"	20@9'-9"	6@2'-11"	20@9'-5"	6@3'-0"	4@3'-3"	6@3'-7"	6@4'-0"	6.65	1.84	3.07
8" W/ 3" DOM	9"	#6@5 1/2"	17@9'-2"	5@2'-11"	16@8'-7"	5@2'-1"	4@3'-3"	5@3'-7"	5@3'-5"	6.12	1.58	2.37
10" W/ 4" DOM	10"	#6@5"	22@10'-9"	6@3'-8"	22@10'-4"	6@2'-11"	4@3'-3"	6@4'-7"	6@4'-3"	7.31	2.19	3.65
10" W/ 3" DOM	9"	#6@5 1/2"	20@10'-3"	5@3'-8"	19@10'-4"	5@2'-11"	4@3'-3"	5@4'-7"	5@3'-8"	7.10	2.07	3.11



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ROOF SLAB AND CONCRETE QUANTITIES
FOR STANDARD VAULT FOR
4", 6", 8", 10", & 12" F.M. METERS WITH
REDUCED SIZE LARGE DOMESTIC METERS

ISSUED

3 / 2008

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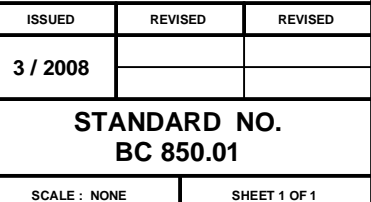
STANDARD NO.
BC 849.01

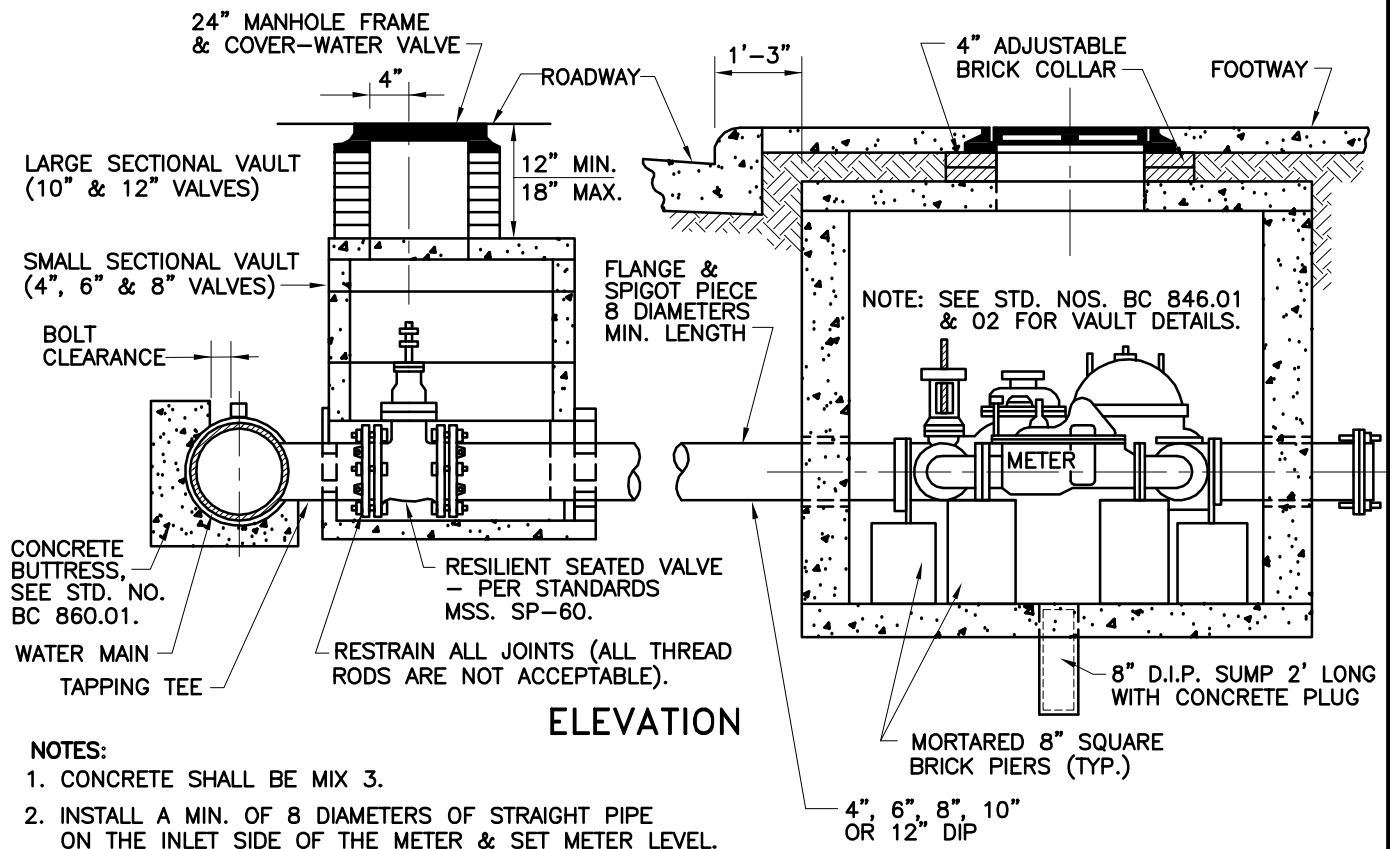
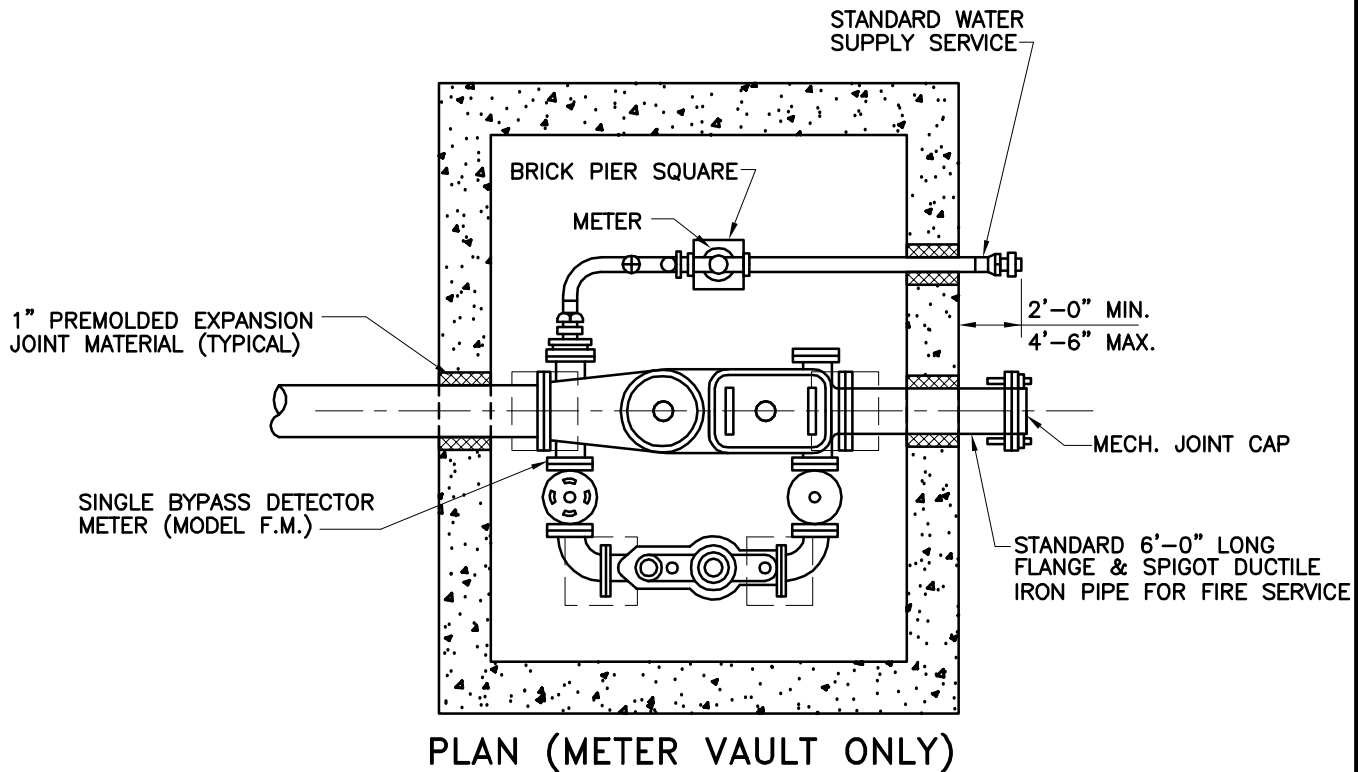
SCALE : NONE

SHEET 3 OF 3



1. CONCRETE SHALL BE MIX 3.
2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER & SET METER LEVEL.





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STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(OUTSIDE FIRE HYDRANTS) WITH TAPPING
SLEEVE AND VALVE (SECTIONAL VAULT)

ISSUED

REVISED

REVISED

3 / 2008

**STANDARD NO.
BC 850.02**

SCALE: NONE

SHEET 1 OF 1

ANGLE VALVE (ALL METERS)

I.P.T. X COPPER
ADAPTER PACKING
JOINT ADAPTER
5/8" & 3/4" M.

I.P.T. BRASS PIPE

4" COMPANION FLANGE
WITH I.P.T. TAP

METER SETTING AS PER STD. NOS. BC 836.01, 837.01, 839.01,
839.02, 840.01, 840.02, AND 840.03. SUPPORT SETTING
WITH MORTARED BRICK.

BALL ANGLE VALVE

BRASS NIPPLE

I.P.T. X COPPER ADAPTER
PACKING JOINT COUPLING

I.P.T. CAP

4'-6" MAX.

2'-0" MIN.

MECH. JT. CAP

COPPER PIPE

FLANGE TEE

DETECTOR CHECK

STANDARD 6'-0" LONG FLANGE & SPIGOT
DUCTILE IRON PIPE FOR FIRE SERVICE
ALL D.I.P. RESTRAINED RETAINER GLANDS

ALL DETAILS SIMILAR

SEE TABLE

4'-6" MAX.

2'-0" MIN.

MECH. JT. CAP

DETECTOR CHECK

A SECTIONS (TYP.)

W.S.S. WITH TEE

W.S.S. SIDE CONNECTION

24" MANHOLE FRAME
& COVER-WATER VALVE

LARGE SECTIONAL VAULT
(10" & 12" VALVES)

SMALL SECTIONAL VAULT
(4", 6" & 8" VALVES)

RESILIENT SEATED VALVE

ANCHOR TEE

WATER MAIN

CONCRETE
BUTTRESS, SEE STD.
NO. BC 860.01.

RESTRAIN ALL JOINTS (ALL
THREAD RODS ARE NOT
ACCEPTABLE).

ROADWAY

1'-3"

4" ADJUSTABLE
BRICK COLLAR

SEE STD. NOS.
BC 877.

FOOTWAY

USE ONLY D.I.P.
RESTRAINED JOINTS
WHEN FITTINGS ARE
USED BETWEEN
VALVE AND METER

4", 6", 8", OR 10"
SERVICE PIPE

MORTARED 8" SQUARE BRICK PIERS

IF DIRECTED BY AN ENGINEER, POUR A 4'x4.5'x4"
REINFORCED CONCRETE BASE (#4@12"E.W.)
(IN LIEU OF "A" SECTIONS)

D.C. METER	WATER SUPPLY SERVICE		A	B	C
	SIDE CONN.	WITH TEE			
4"	3/4" - 1"	1 1/2", 2"	4'-9"	3'-9"	AS PER STD. NOS. BC 836 TO 840.
6"	3/4"-1 1/2"	2"	5'-4"	4'	
8"	3/4"-2"	N/A	5'-10"	4'	
10"	3/4"-2"	N/A	6'	4'	

OPENING AROUND PIPE TO
BE BRICKED UP ON THE
OUTSIDE OF VAULT AFTER
METER IS INSTALLED.



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STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(NO OUTSIDE FIRE HYDRANTS) WITH
TEE AND VALVE (SECTIONAL VAULT)

ISSUED

REVISED

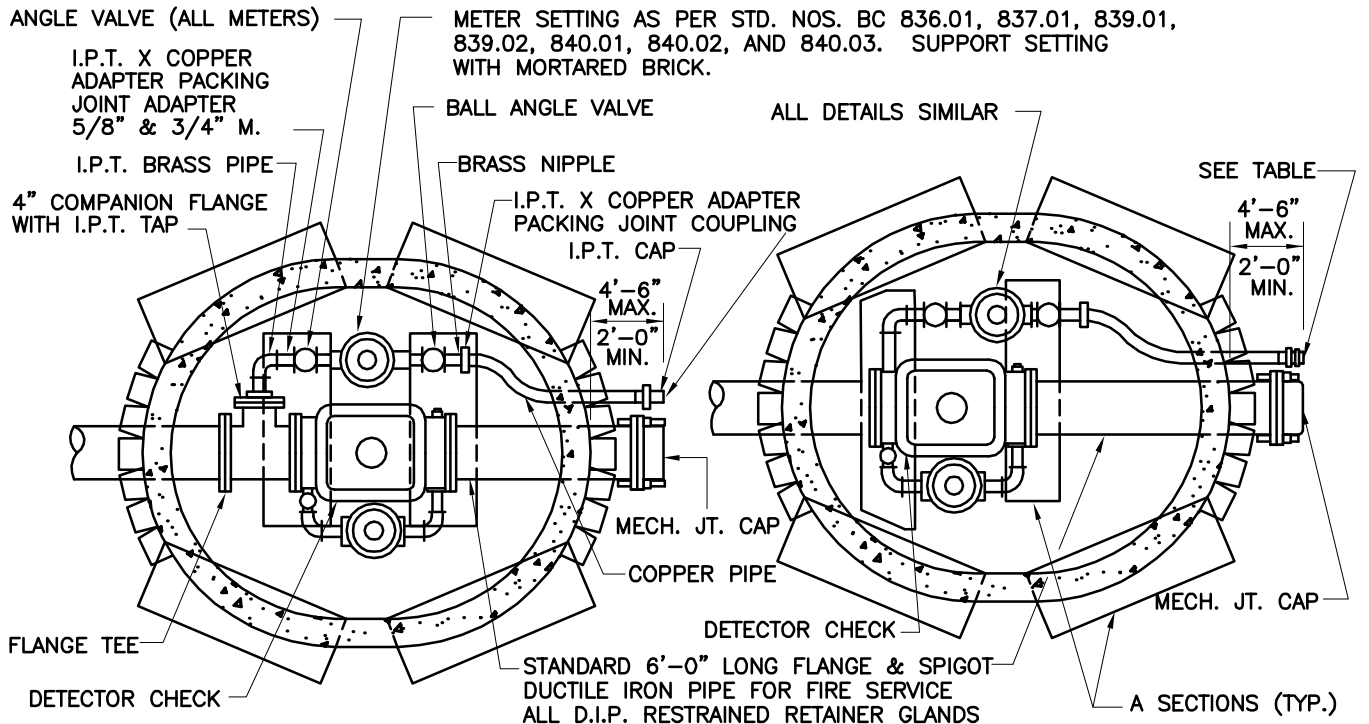
REVISED

3 / 2008

STANDARD NO.
BC 851.01

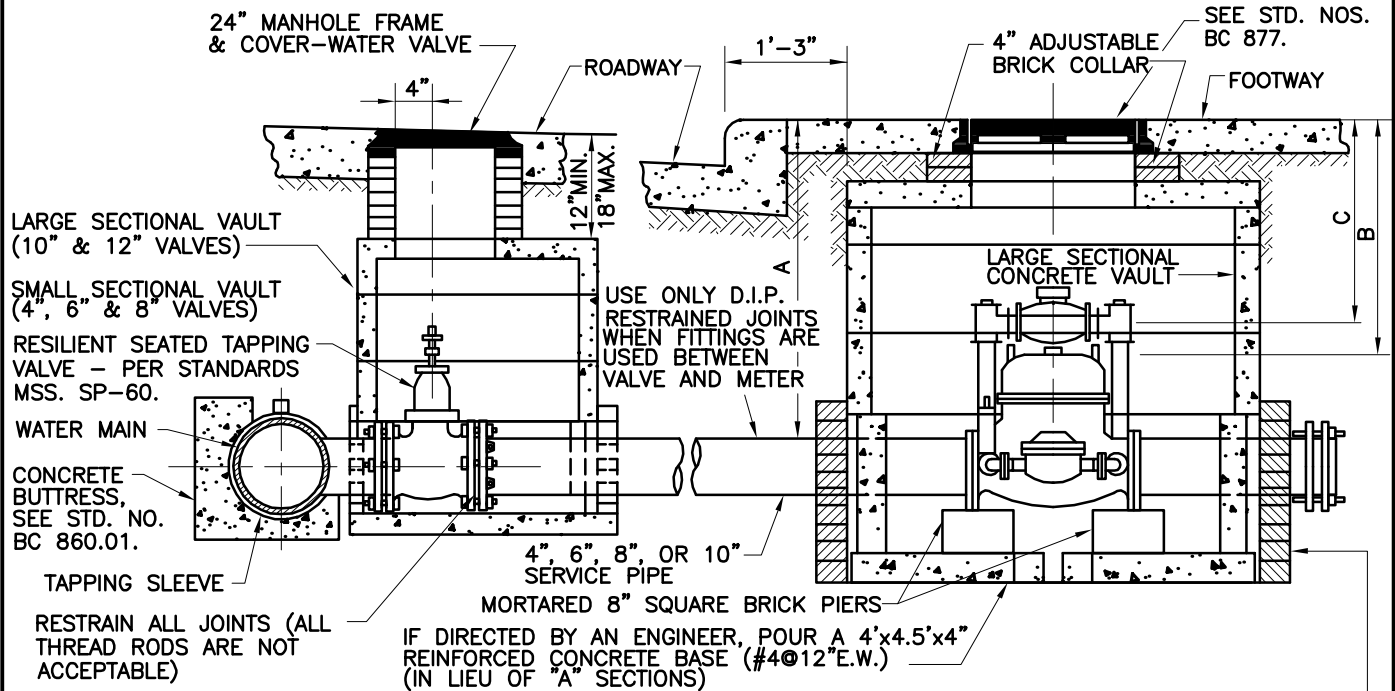
SCALE : NONE

SHEET 1 OF 1



W.S.S. WITH TEE

W.S.S. SIDE CONNECTION



D.C. METER	WATER SUPPLY SERVICE		A	B	C
	SIDE CONN.	WITH TEE			
4"	3/4" - 1"	1 1/2", 2"	4'-9"	3'-9"	AS PER STD. NOS. BC 836 TO 840.
6"	3/4"-1 1/2"	2"	5'-4"	4'	
8"	3/4"-2"	N/A	5'-10"	4'	
10"	3/4"-2"	N/A	6'	4'	



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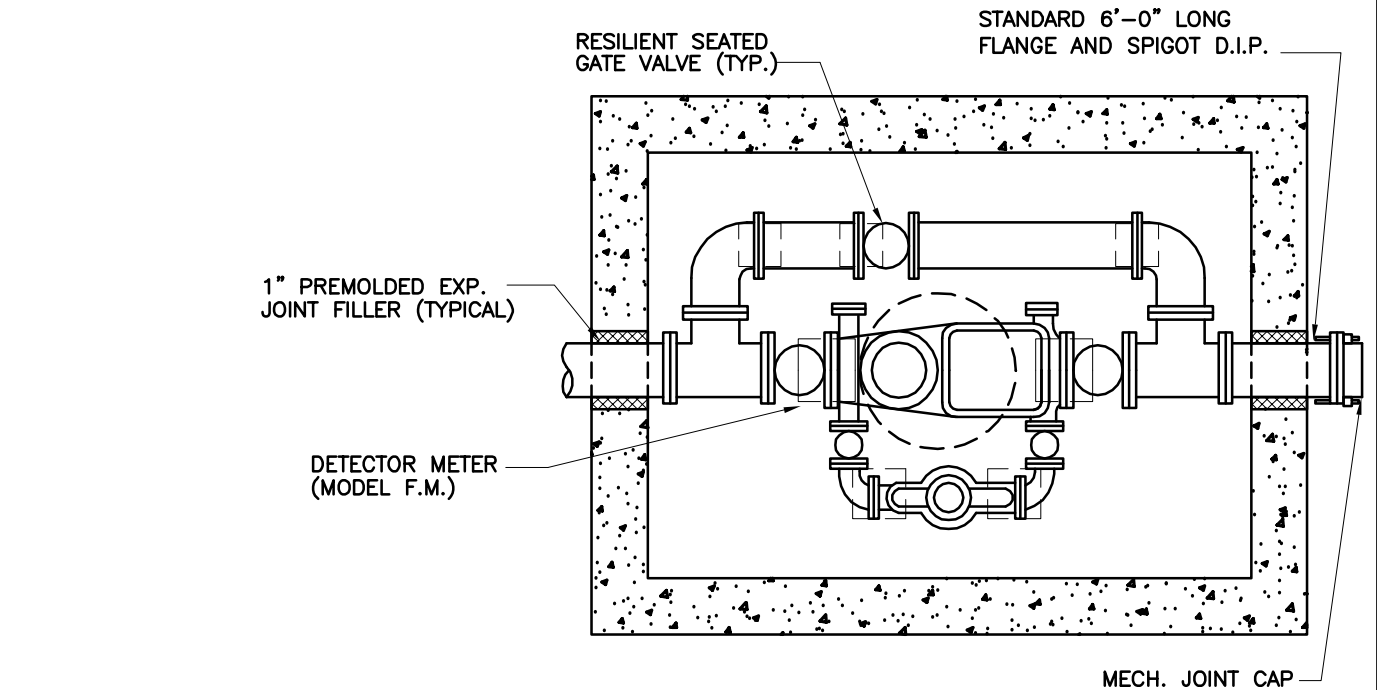
STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" FIRE SUPPLY SERVICES
WITH WATER SUPPLY SERVICE
(NO OUTSIDE FIRE HYDRANTS) WITH TAPPING
SLEEVE AND VALVE (SECTIONAL VAULT)

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 851.02

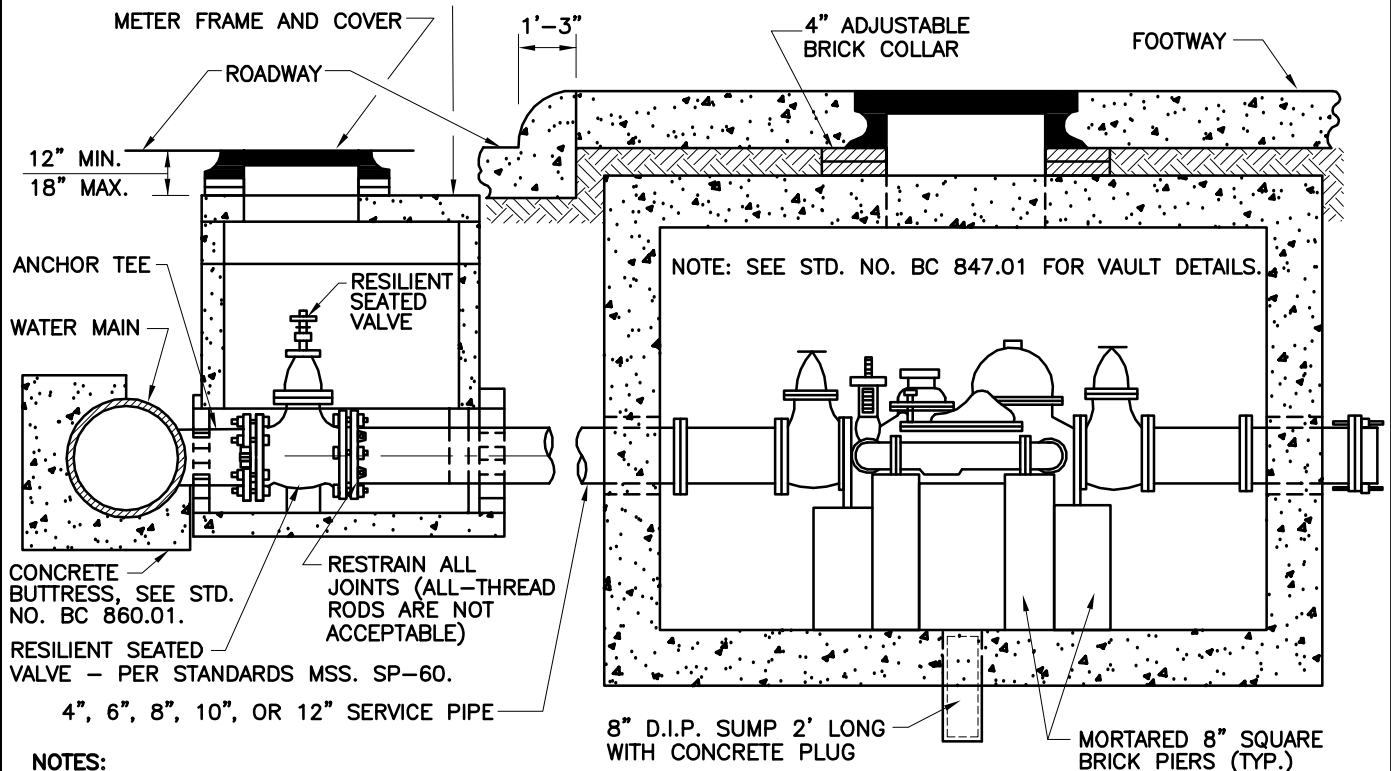
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SHEET 1 OF 1



PLAN (METER VAULT ONLY)

LARGE SECTIONAL VAULT (10" & 12" VALVES)
SMALL SECTIONAL VAULT (4", 6", & 8" VALVES)



ELEVATION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. INSTALL A MIN. OF 8 DIAMETERS OF STRAIGHT PIPE ON THE INLET SIDE OF THE METER AND SET METER LEVEL.



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STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" WATER SUPPLY SERVICES
(4", 6", 8", 10", & 12" COMBINED SERVICES)
WITH TEE AND VALVE (SECTIONAL VAULT)

ISSUED

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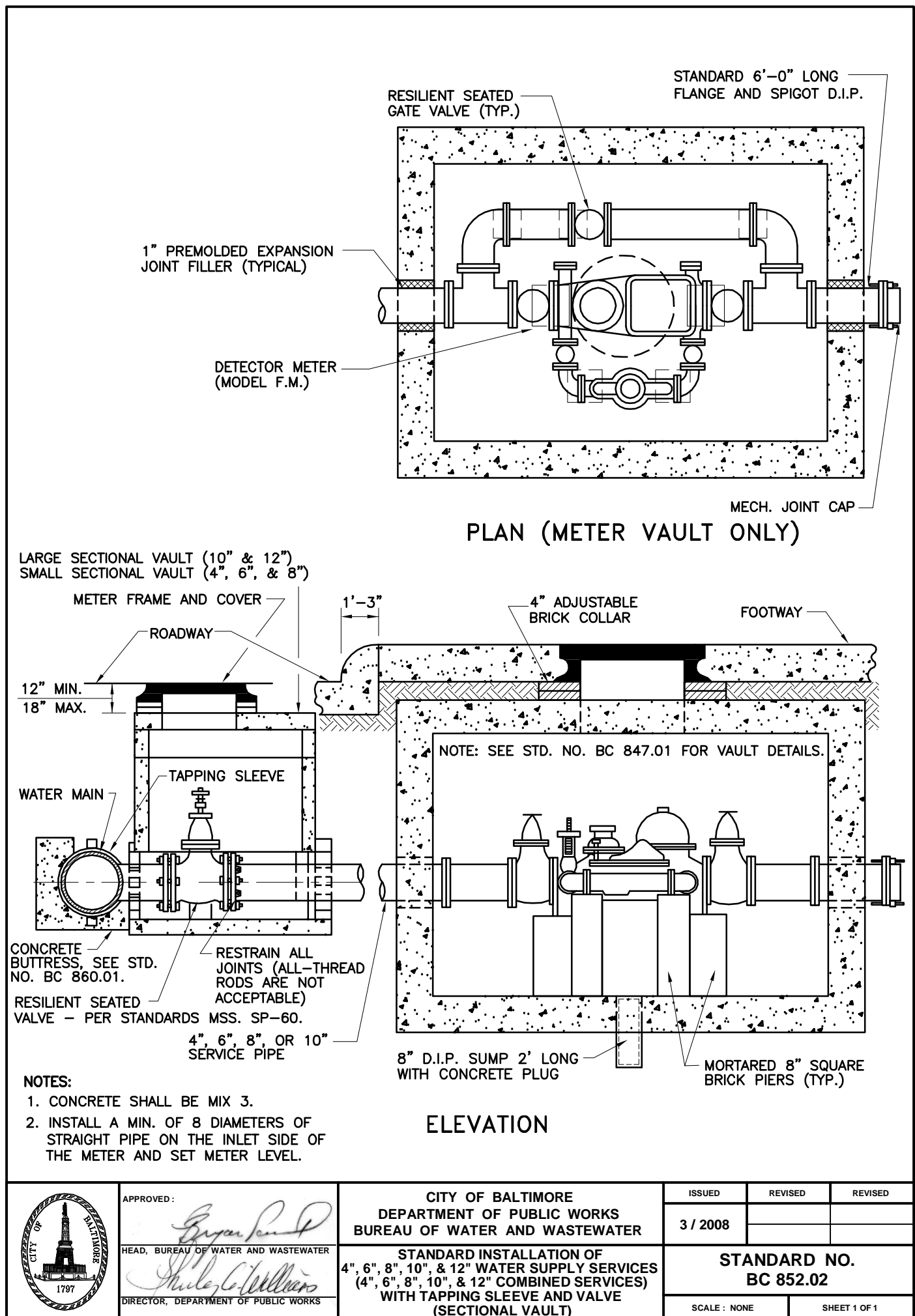
REVISED

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STANDARD NO.
BC 852.01

SCALE: NONE

SHEET 1 OF 1

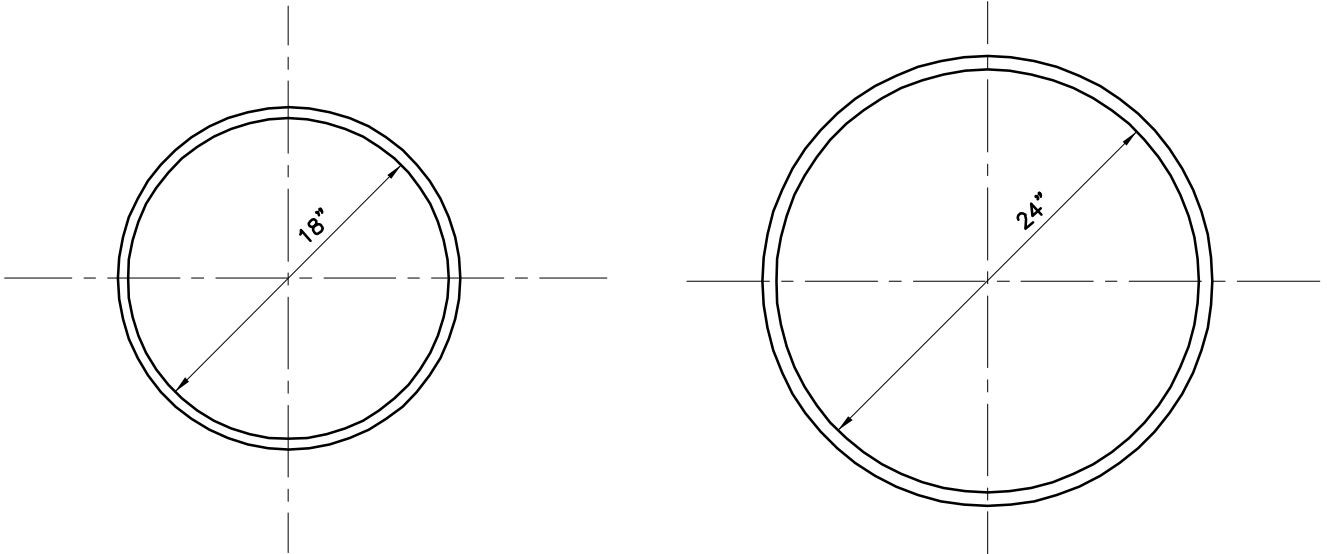


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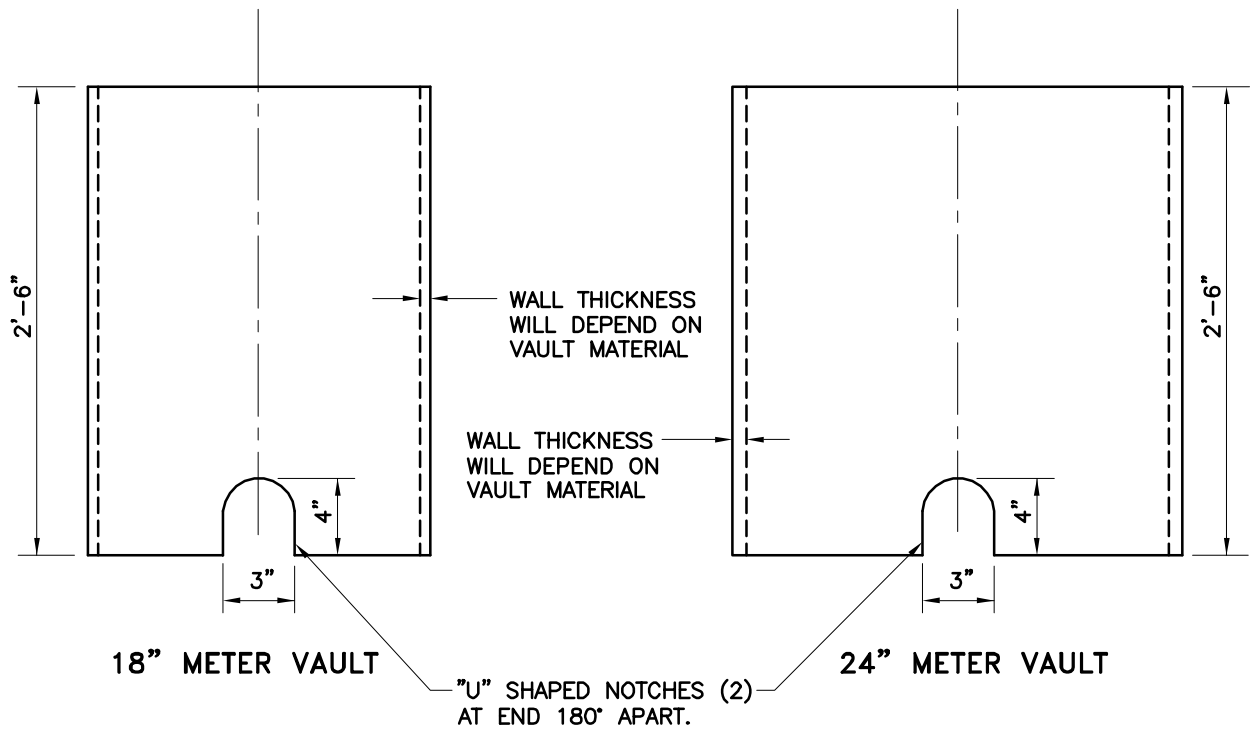
STANDARD INSTALLATION OF
4", 6", 8", 10", & 12" WATER SUPPLY SERVICES
(4", 6", 8", 10", & 12" COMBINED SERVICES)
WITH TAPPING SLEEVE AND VALVE
(SECTIONAL VAULT)

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 852.02		
SCALE: NONE		SHEET 1 OF 1



NOTE:

METER VAULTS SHOULD BE PVC, PE, FIBERGLASS, OR APPROVED EQUAL.



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STANDARD WATER
METER VAULTS

ISSUED

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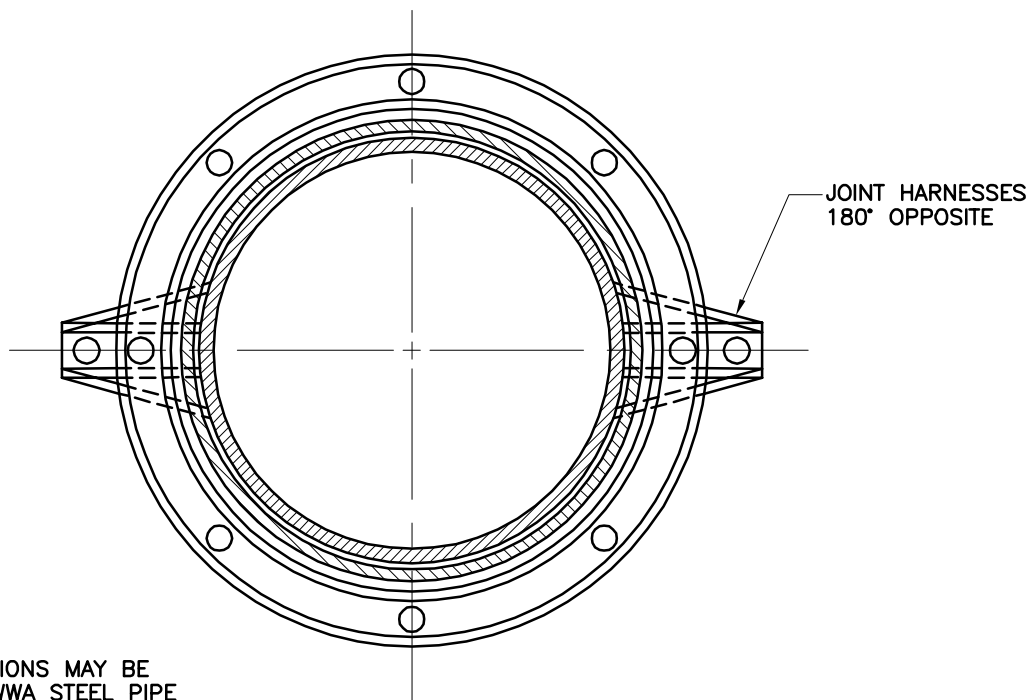
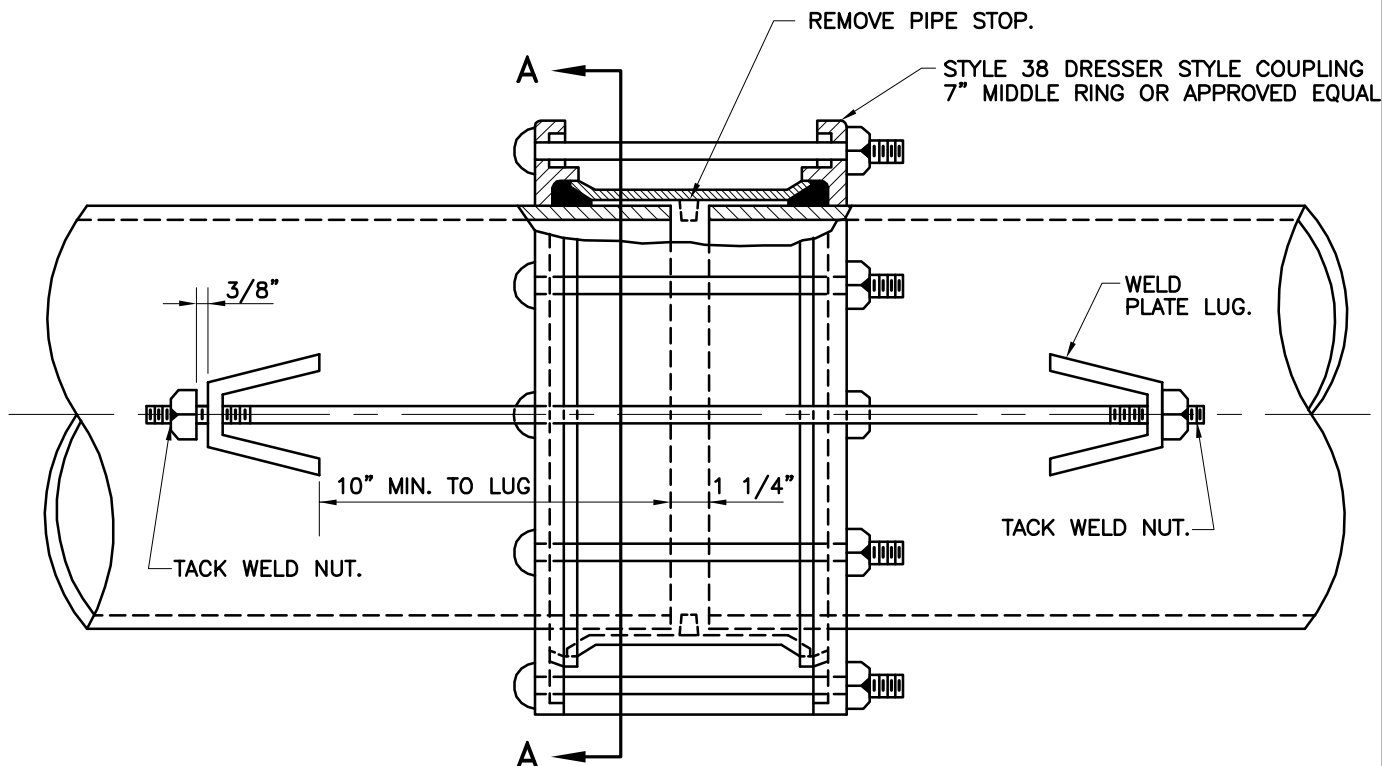
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3 / 2008

STANDARD NO.
BC 853.01


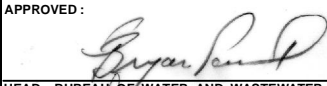
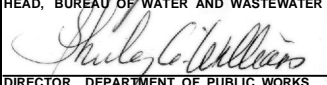
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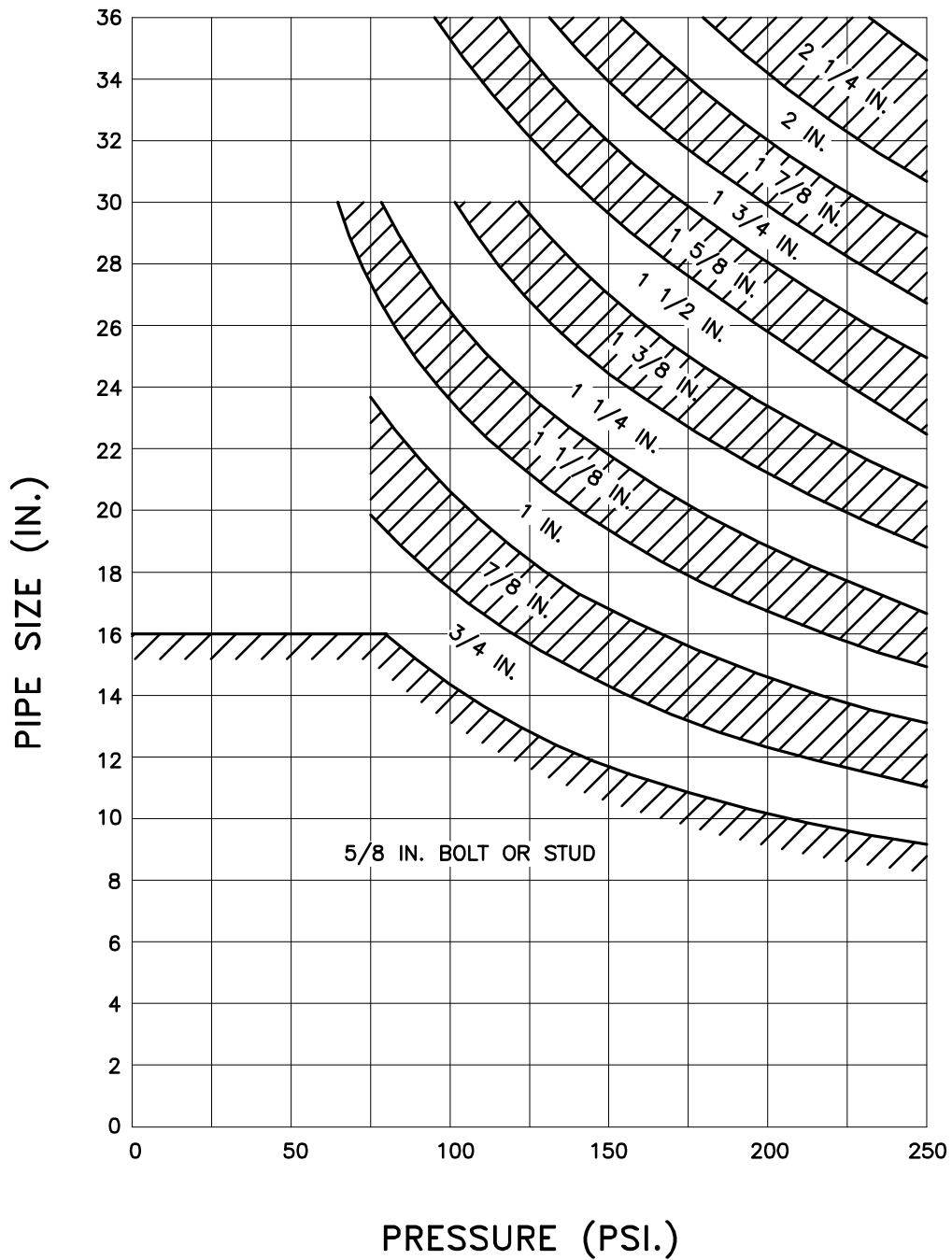
SHEET 1 OF 1



NOTE:
 PLATE LUG DIMENSIONS MAY BE
 OBTAINED FROM AWWA STEEL PIPE
 MANUAL.

SECTION A-A

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD INSTALLATION OF WATER MAIN ON STRUCTURES (STEEL PIPE ONLY)	ISSUED	REVISED	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 854.01		
			SCALE : NONE	SHEET 1 OF 1	



NOTE:
THE BOLT SIZE SHOWN IN A STRIP AREA MAY BE USED FOR ANY COMBINATION OF PIPE SIZE AND PRESSURE LINES INTERSECTING IN THAT AREA.

SOURCE:
AWWA STEEL PIPE MANUAL



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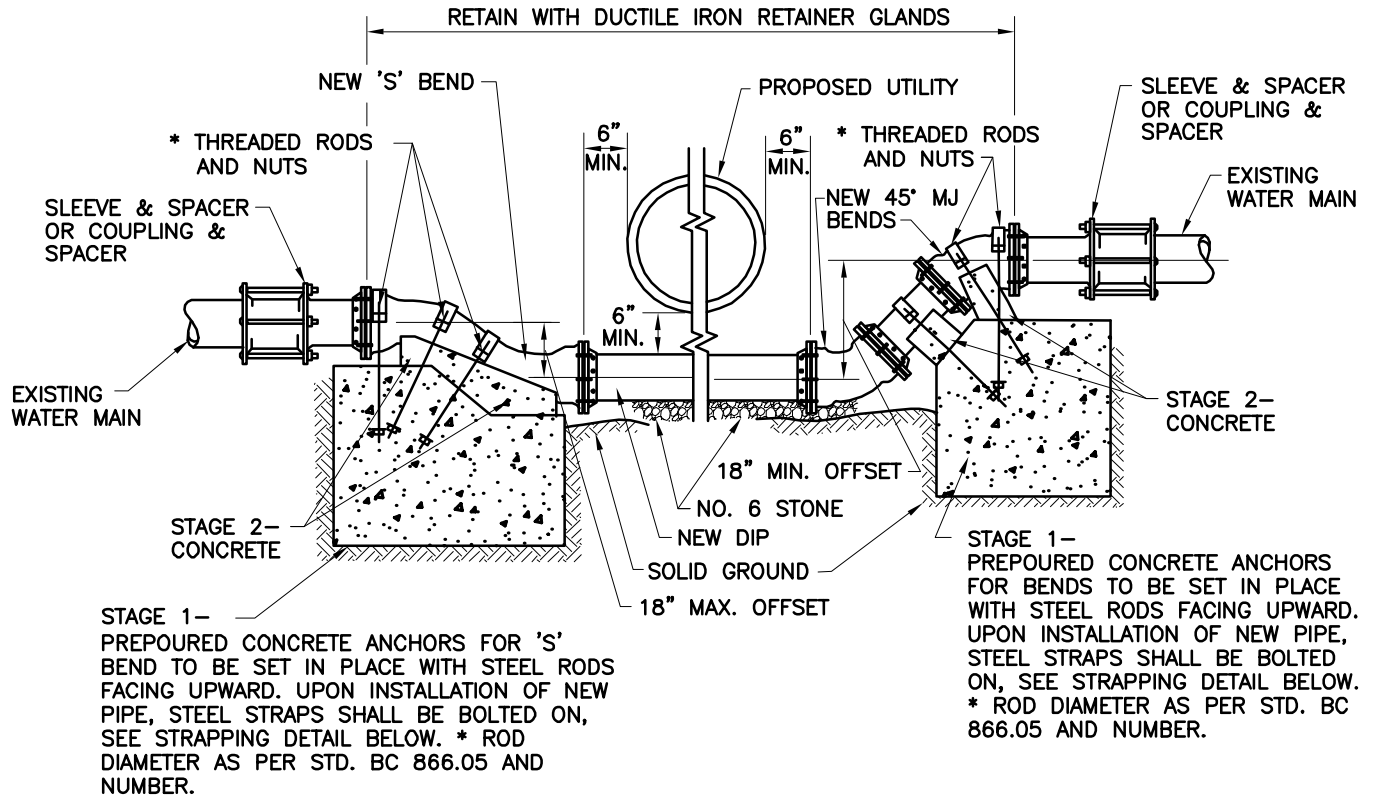
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

BOLT SIZE CHART FOR
STANDARD INSTALLATION OF
WATER MAIN ON STRUCTURES
(STEEL PIPE ONLY)

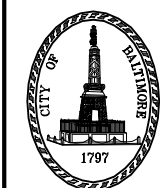
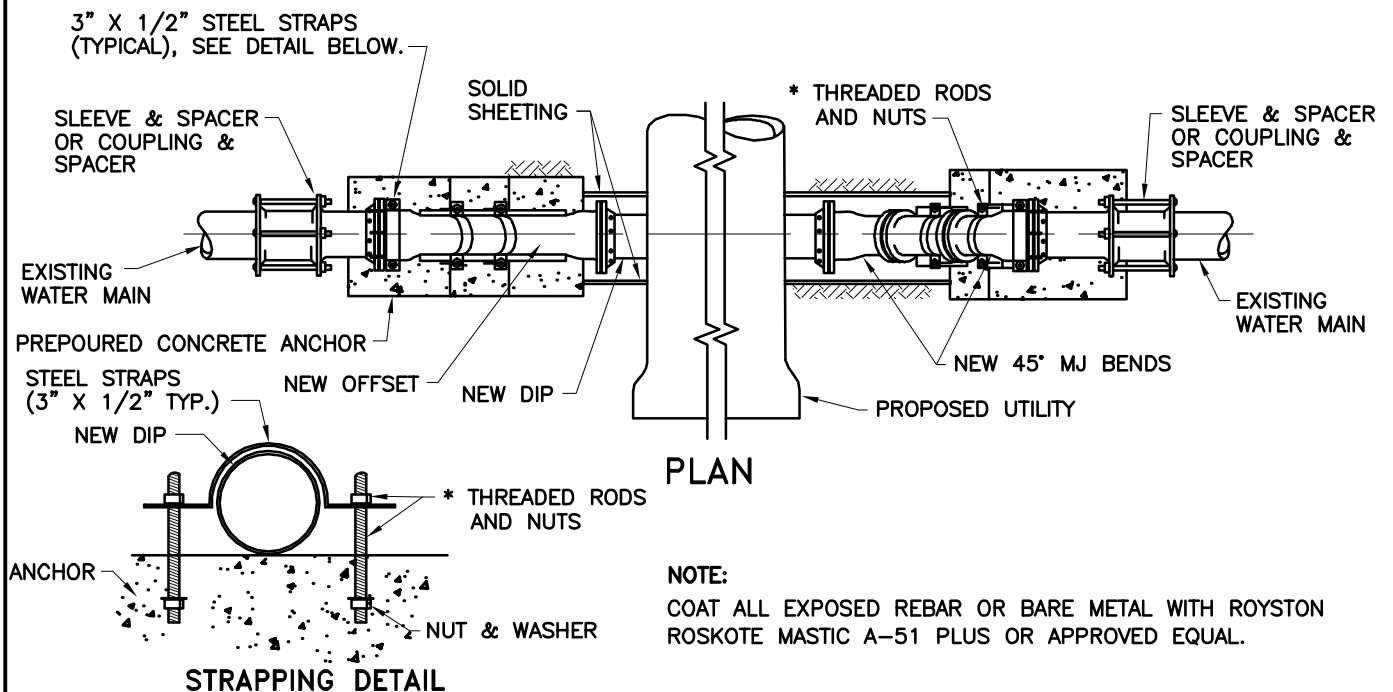
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 854.02		
SCALE : NONE		SHEET 1 OF 1

'S' BEND $\leq 18"$ OFFSET

TWO 45° BENDS $< 18"$ OFFSET



ELEVATION



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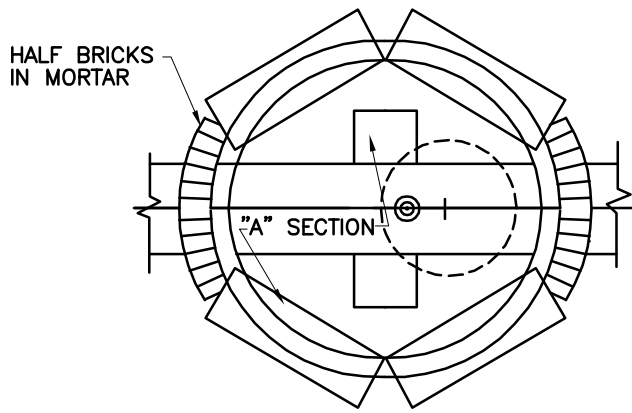
WATER MAIN RELOCATION
UNDER PROPOSED UTILITY

ISSUED	REVISED	REVISED
3 / 2008		

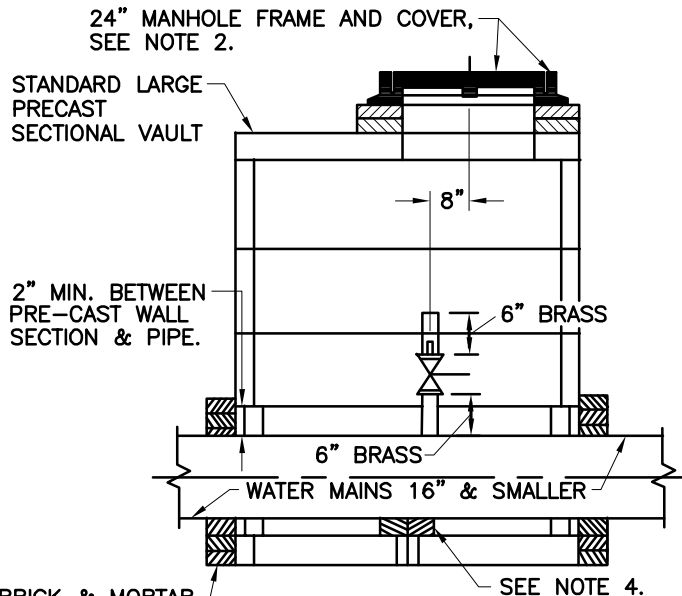
STANDARD NO.
BC 855.01

SCALE : NONE

SHEET 1 OF 1



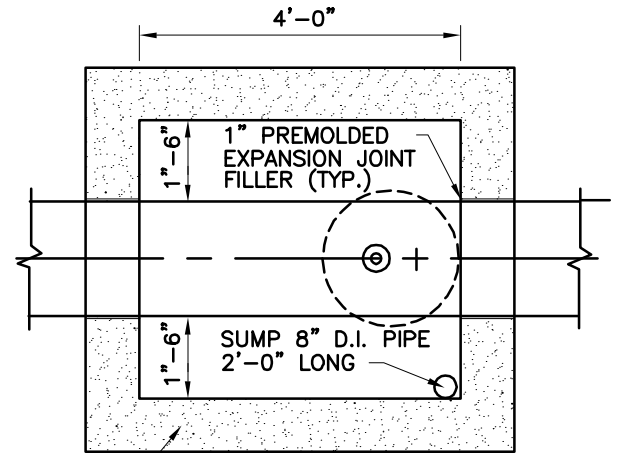
PLAN



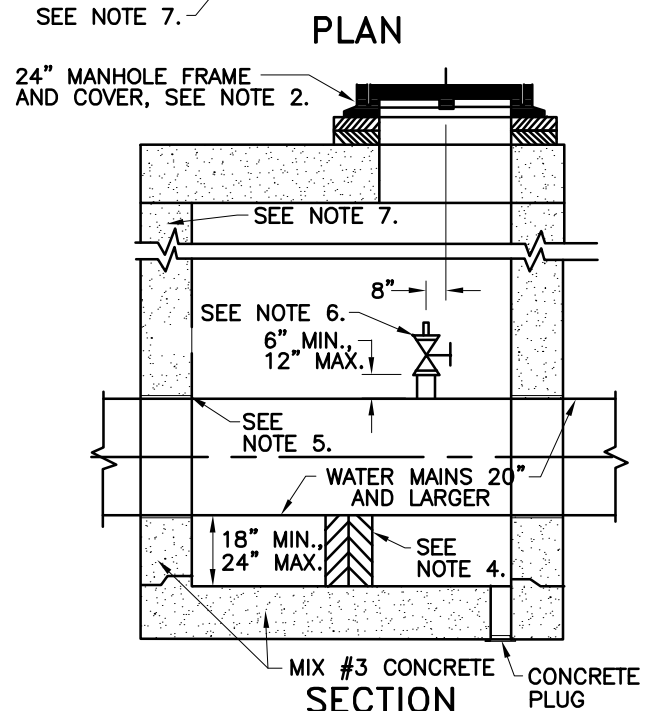
SECTION

NOTES:

1. HYDRANT MAY BE INSTALLED AS AN ALTERNATE TO THE AIR RELEASE VALVE.
2. MANHOLE COVER TO BE MARKED "WATER VALVE MAIN VAULT".
3. FOR CONNECTION TO 4" DUCTILE IRON PIPE, USE SERVICE SADDLE (FORD FC-202 OR SMITH-BLAIR 315). FOR CONNECTION TO 4"-30" HDPE PIPE, USE APPROVED ELECTROFUSION TAPPING SADDLE.
4. SUPPORTS FOR PIPES:
4" TO 16" PIPES "A" SECTION & 8" BRICK PIER:
20" TO 30" PIPES: 12" X 12" BRICK PIER;
36"+ PIPES: 12" WIDE REINF. CONC. CRADLE.
PROVIDE BOND BREAKER.
5. PLACE 1" PREMOLDED EXPANSION JOINT FILLER AROUND PIPE (TYP.) FOR CAST-IN-PLACE STRUCTURES.
6. PIPE 36" & LARGER - PROVIDE VERTICAL OUTLET, VALVE & BLIND FLANGE WITH GASKET. DRILL & TAP CENTER OF BLIND FLANGE & PROVIDE FORD FB500-4 CORPORATION WITH LA21-44 EIGHTH BEND OR APPROVED EQUAL.
7. CAST-IN-PLACE VAULT (SHOWN) OR PRECAST VAULT WITH DOGHOUSE OPENINGS (NOT SHOWN).
8. FOR CONNECTION TO 6" - 12" DUCTILE IRON PIPE, CONTRACTOR MAY INSTALL CORPORATION USING SERVICE SADDLE (FORD FC-202 OR SMITH-BLAIR 315). FOR CONNECTION TO 16" - 30" DUCTILE IRON PIPE, CONTRACTOR MAY INSTALL CORPORATION USING SERVICE SADDLE (FORD FC-202 OR SMITH-BLAIR 317).



PLAN



SECTION

TABLE 1	
PIPE DIAMETER	AIR RELEASE ASSEMBLY
4"	1" CORP. WITH TAPPING SADDLE/ GATE VALVE
6"	1" CORP./GATE VALVE
8"-12"	1.5" CORP./GATE VALVE
16"-30"	2" CORP./GATE VALVE
36"-48"	4" RESILIENT GATE VALVE, FL. x FL.
54"+	6" RESILIENT GATE VALVE, FL. x FL.



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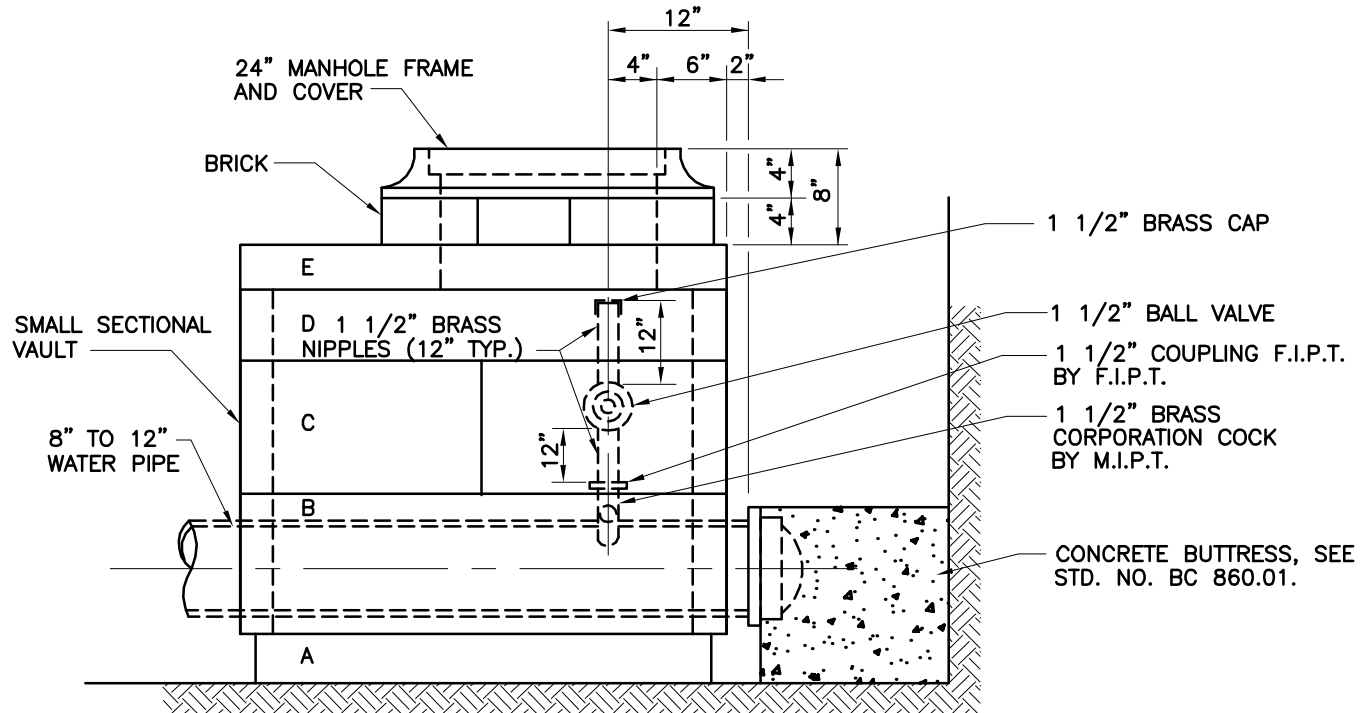
STANDARD AIR RELEASE
VALVE AND VAULT
PRECAST AND CAST IN PLACE

ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 856.01

SCALE : NONE

SHEET 1 OF 1



NOTES:

1. ON 4" AND 6" PIPE (ALL TYPES) USE 1" CORPORATION STOP, 1" GATE VALVE AND 1" PIPE.
2. ON 4" DUCTILE IRON PIPE USE SERVICE SADDLE (FORD FC202 OR SMITH-BLAIR 315).
3. FOR CONNECTION TO 6" - 12" DUCTILE IRON PIPE, CONTRACTOR MAY INSTALL CORPORATION USING SERVICE SADDLE (MUELLER BR-2B, FORD 202B AY MCDONALD 3826, OR APPROVED EQUAL).
4. ON 4" - 12" HDPE PIPE, USE APPROVED ELECTROFUSION TAPPING SADDLE.
5. BRASS PIPE SHALL BE SEAMLESS RED BRASS PIPE, EXTRA STRONG, CONFORMING TO A.S.T.M. B43 - LATEST EDITION.
6. USE HYDRANT FOR PIPES LARGER THAN 12 INCHES IN DIAMETER. CONNECT HYDRANT WITHIN 5 FEET OF END CAP.



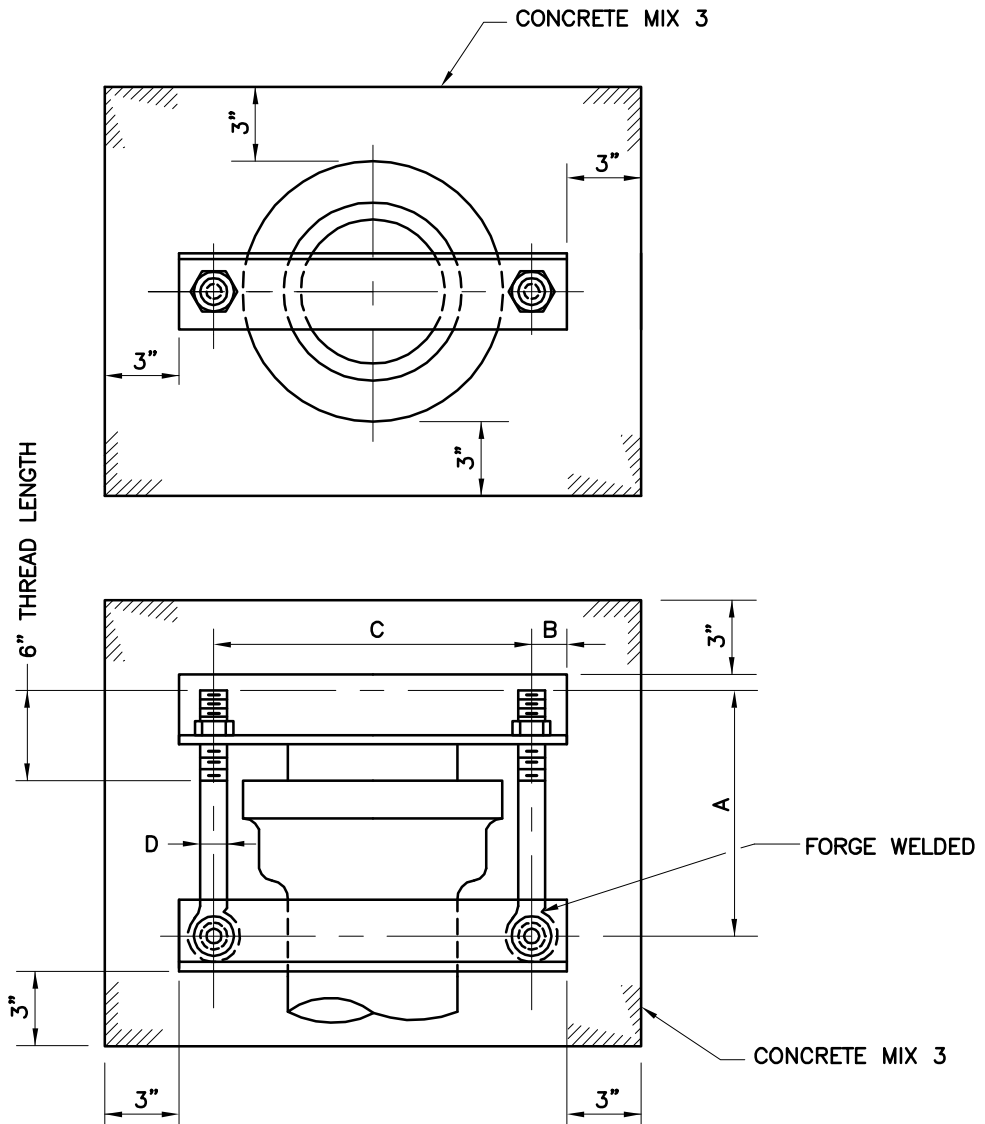
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STANDARD INSTALLATION
 FOR BLOW

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 857.01		
SCALE : NONE		SHEET 1 OF 1



NOTE:
MAKE HOLES IN ANGLE 1/8" LARGER THAN DIAMETER OF BOLT.

SIZE OF MAIN	SIZE OF ANGLE	C TO C EYE BOLT HOLES "C"	DIA. OF EYEBOLT "D"	LENGTH OF EYEBOLT "A"	NO. U.S. THREADS PER INCH	EDGE DIST. "B"
4"	3"x3"x3/8"	11"	3/4"	12"	10	2"
6"	3"x3"x3/8"	12 1/2"	3/4"	12"	10	2"
8"	3"x3"x3/8"	15"	7/8"	12 1/2"	9	2"
10"	4"x3"x3/8"	17 1/2"	1 1/8"	13 1/2"	7	2"
12"	5"x4"x3/8"	20 3/16"	1 1/2"	14 1/2"	6	2 1/4"
16"	6"x4"x1/2"	25 1/4"	1 5/8"	16 3/4"	5 1/2	2 1/2"
20"	6"x4"x3/4"	30 7/8"	2 1/4"	16 3/4"	4 1/2	3 5/8"



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STANDARD
PLUG CLAMPS - 1

ISSUED

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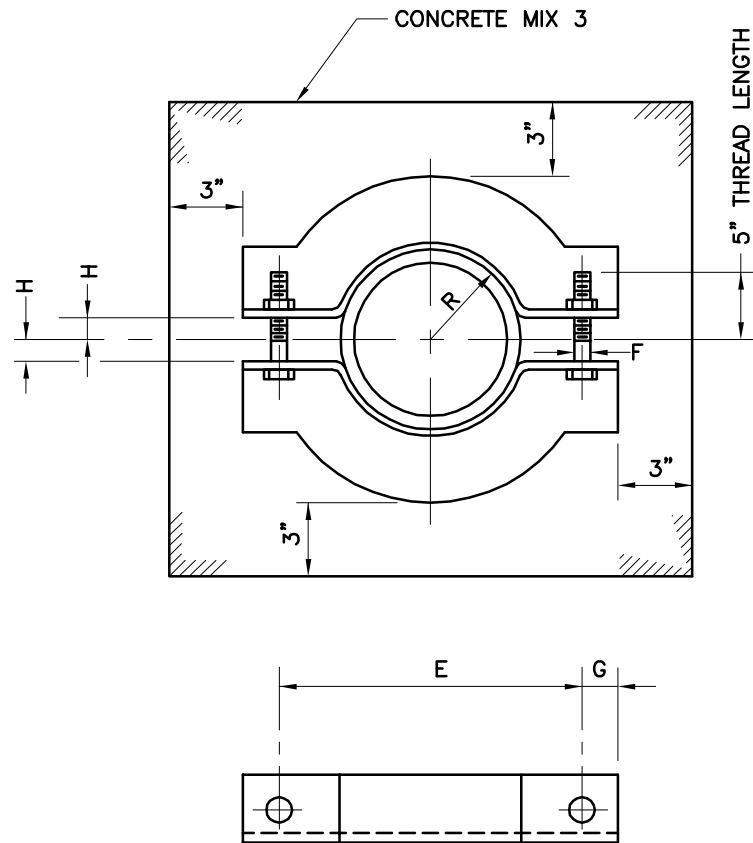
REVISED

3 / 2008

STANDARD NO.
BC 858.01

SCALE : NONE

SHEET 1 OF 2



NOTE:
MAKE HOLES IN ANGLE STRAP $1/8"$ LARGER THAN DIAMETER OF BOLT.

SIZE OF MAIN	SIZE OF ANGLE STRAP	RADIUS OF STRAP "R"	DISTANCE OF HOLES C TO C "E"	DIA. OF BOLT "F"	EDGE DIST. "G"	"H"
4"	3"x3"x3/8"	2 1/2"	11"	3/4"	2"	1"
6"	3"x3"x3/8"	3 9/16"	12 1/2"	3/4"	2"	1"
8"	3"x3"x3/8"	4 21/32"	15"	7/8"	2"	1 1/4"
10"	4"x3"x3/8"	5 23/32"	17 1/2"	1 1/8"	2"	1 1/4"
12"	5"x4"x3/8"	6 3/4"	20 3/16"	1 1/2"	2 1/4"	1 1/2"
16"	6"x4"x1/2"	8 29/32"	25 1/4"	1 5/8"	2 1/2"	1 1/2"
20"	6"x4"x3/4"	11 1/32"	30 7/8"	2 1/4"	3 5/8"	1 3/4"

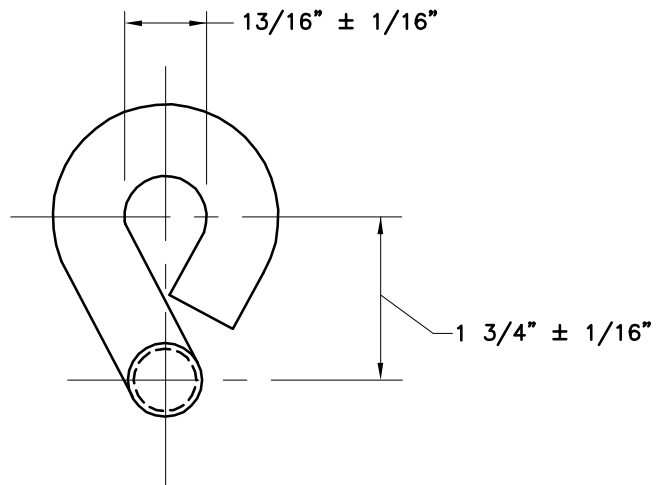
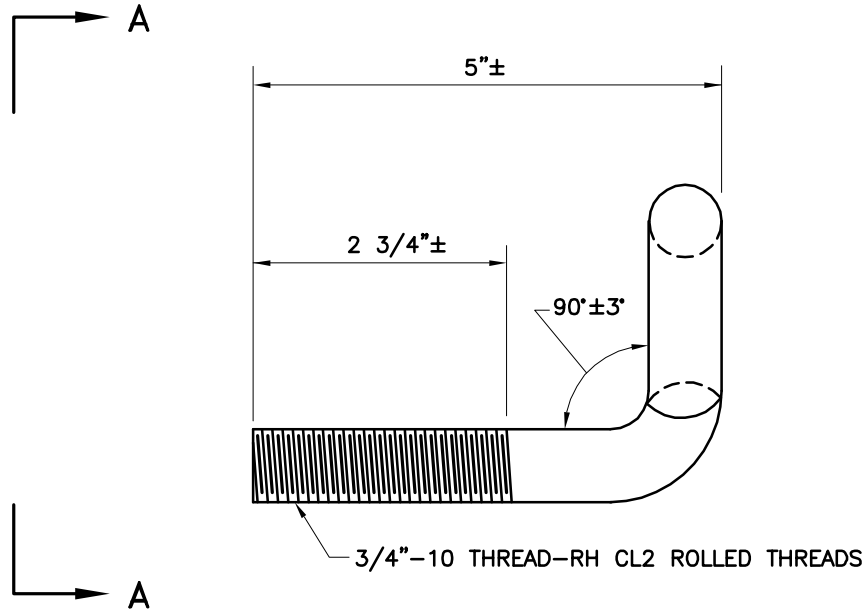


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STANDARD
PLUG CLAMPS - 2

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 858.01		
SCALE : NONE		SHEET 2 OF 2



VIEW A-A

MATERIAL:
 C1010, BLACK ANNEALED
 45,000 TO 55,000 P.S.I. TENSILE
 26,000 TO 35,000 P.S.I. YIELD
 % ELONG. TO 2" 30-45%
 % ELONG. 8" 25-40%



APPROVED :

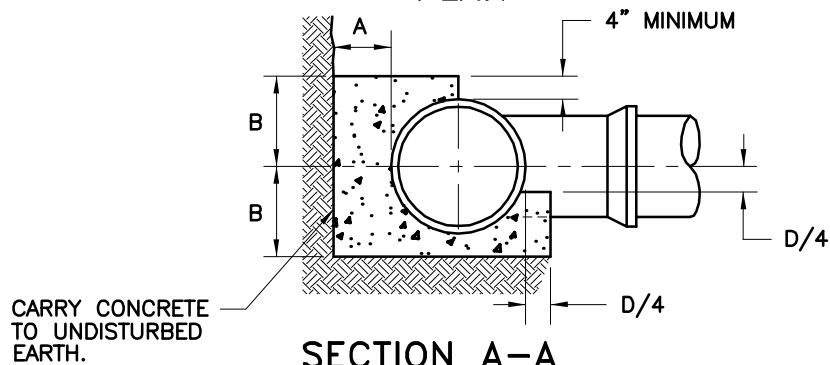
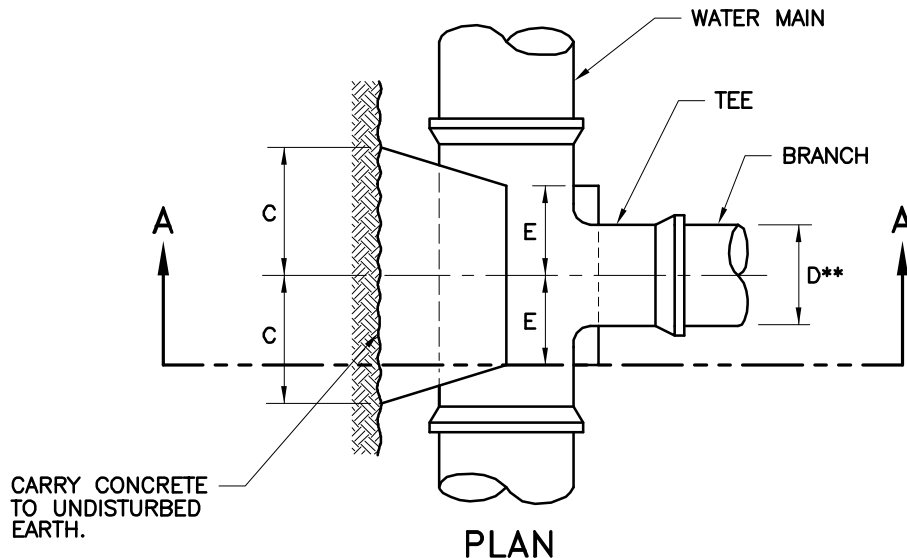
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STANDARD TIE BOLT

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 859.01		
SCALE : NONE		SHEET 1 OF 1



BUTTRESS FOR TEES							
PIPE SIZE OF BRANCH							
D**	4"	6"	8"	10"	12"	16"	20"
A	8"	8"	10"	1'-0"	1'-0"	1'-6"	2'-0"
B	9"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"
C	9"	1'-0"	1'-6"	1'-6"	2'-0"	2'-6"	3'-0"
E	6"	6"	8"	8"	8"	10"	1'-2"
D** INDICATES NOMINAL DIAMETER PIPE SIZES							

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.

- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
- DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



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BUTTRESS FOR TEES
(FOR 4" - 20")

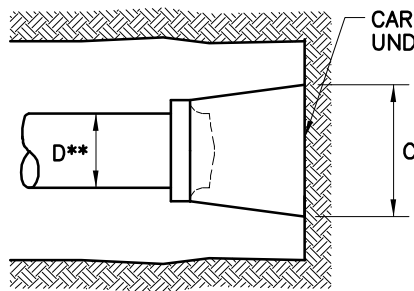
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3 / 2008

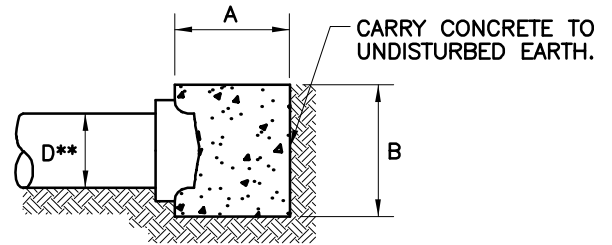
STANDARD NO.
BC 860.01

SCALE : NONE

SHEET 1 OF 1



PLAN



SECTION

BUTTRESS FOR CAPS							
PIPE SIZE							
D**	4"	6"	8"	10"	12"	16"	20"
A	8"	8"	10"	12"	12"	1'-6"	2'-0"
B	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	4'-0"	5'-0"
C	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-6"	5'-6"
D** INDICATES NOMINAL DIAMETER PIPE SIZES							

NOTES:

1. ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
2. THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - a. ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - b. OPERATING WATER PRESSURE = 150 PSI.
 - c. DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - d. ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
3. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
4. ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.

- a. DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
- b. DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



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BUTTRESS FOR CAPS
(FOR 4" - 20")

ISSUED

REVISED

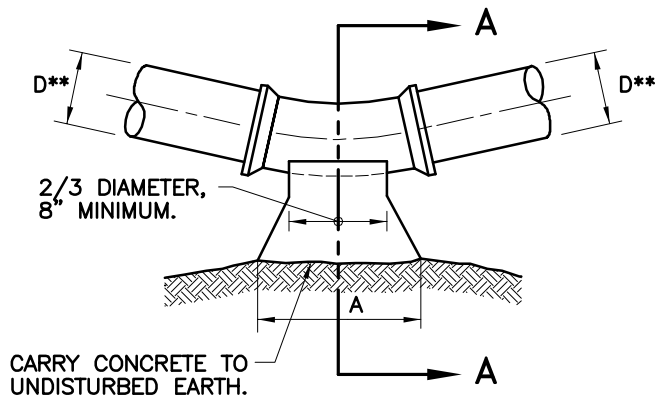
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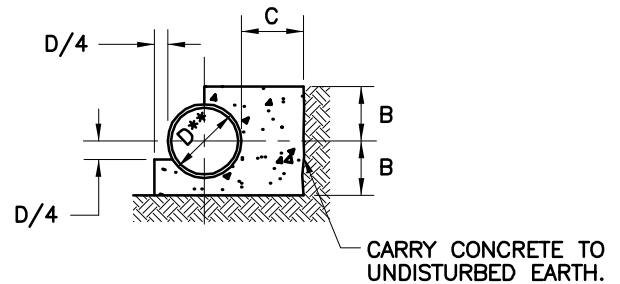
STANDARD NO.
BC 861.01

SCALE : NONE

SHEET 1 OF 1



PLAN



SECTION A-A

BUTTRESS FOR HORIZONTAL BENDS								
	PIPE SIZE							
	D**	4"	6"	8"	10"	12"	16"	20"
1/32 BEND	A	9"	9"	1'-0"	1'-0"	1'-6"	2'-0"	3'-0"
	B	9"	9"	9"	1'-0"	1'-0"	1'-0"	1'-0"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"
1/16 BEND	A	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"	3'-0"	3'-0"
	B	9"	9"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"	3'-0"
1/8 BEND	A	1'-6"	1'-6"	2'-0"	2'-6"	3'-0"	4'-0"	4'-6"
	B	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"	2'-0"	2'-6"
	C	1'-0"	1'-0"	1'-0"	2'-0"	2'-6"	3'-0"	4'-0"
1/4 BEND	A	2'-6"	2'-6"	3'-0"	3'-6"	4'-0"	5'-6"	SITE SPECIFIC DESIGN REQUIRED
	B	1'-0"	1'-0"	1'-6"	2'-0"	2'-6"	2'-6"	
	C	1'-6"	2'-0"	2'-6"	2'-6"	3'-6"	4'-0"	
D** INDICATES NOMINAL DIAMETER PIPE SIZES								

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.

- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
- DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



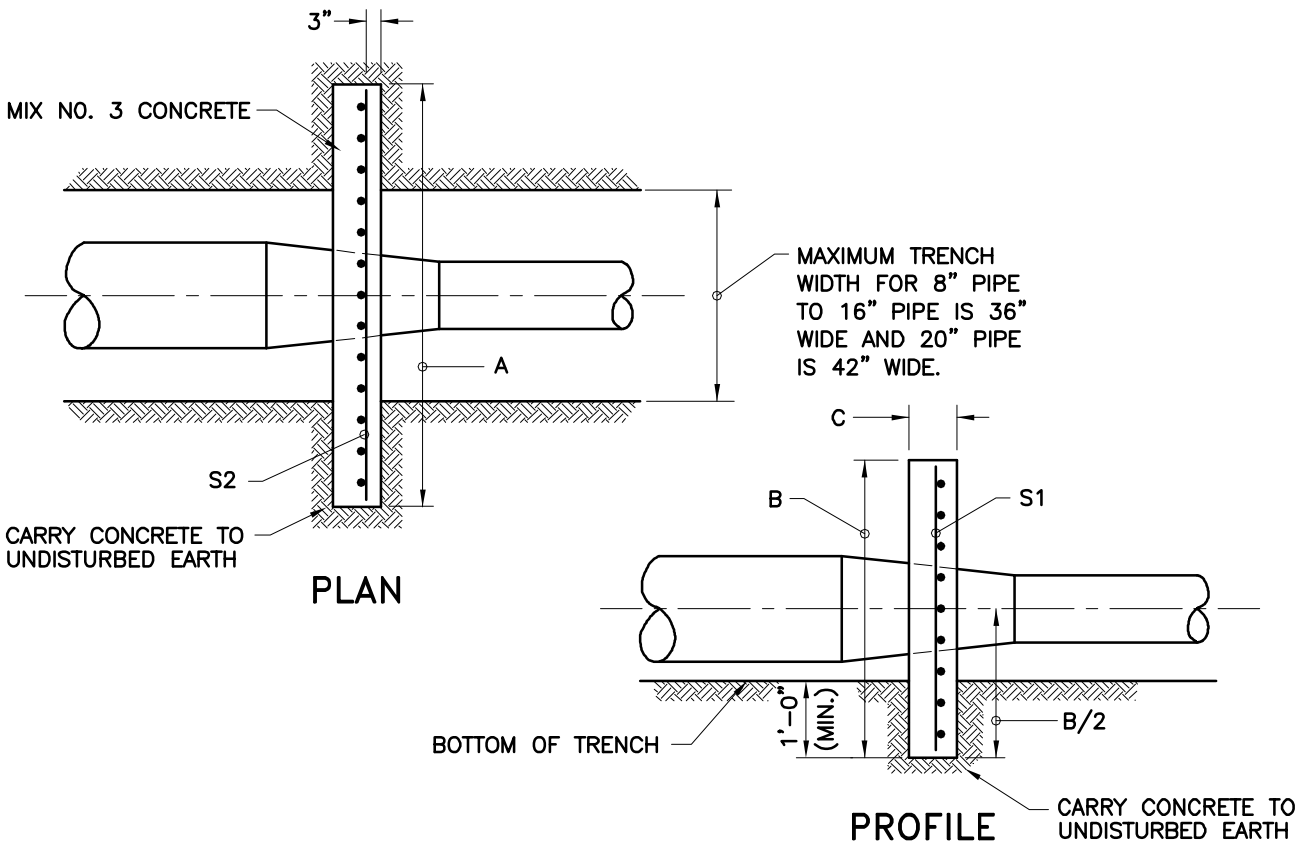
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BUTTRESS FOR HORIZONTAL BENDS
(FOR 4" - 20")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 862.01		
SCALE : NONE		SHEET 1 OF 1



SIZE	A	B	C	S1	S2
8" x 4"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
12" x 4"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
12" x 6"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
12" x 8"	6' - 0"	3' - 0"	1'-0"	12 - #6	6 - #6
16" x 6"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6
16" x 8"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6
16" x 10"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6
16" x 12"	8' - 0"	3' - 6"	1'-0"	16 - #6	7 - #6

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.
- THRUST BLOCKS FOR REDUCERS CAN ONLY BE INSTALLED ON CONCENTRIC TYPE PIPE REDUCERS.

SITE SPECIFIC DESIGN CRITERIA:

IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.

- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
- DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



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THRUST BLOCKS FOR REDUCERS
 (FOR 8" X 4" TO 16" X 12")

ISSUED

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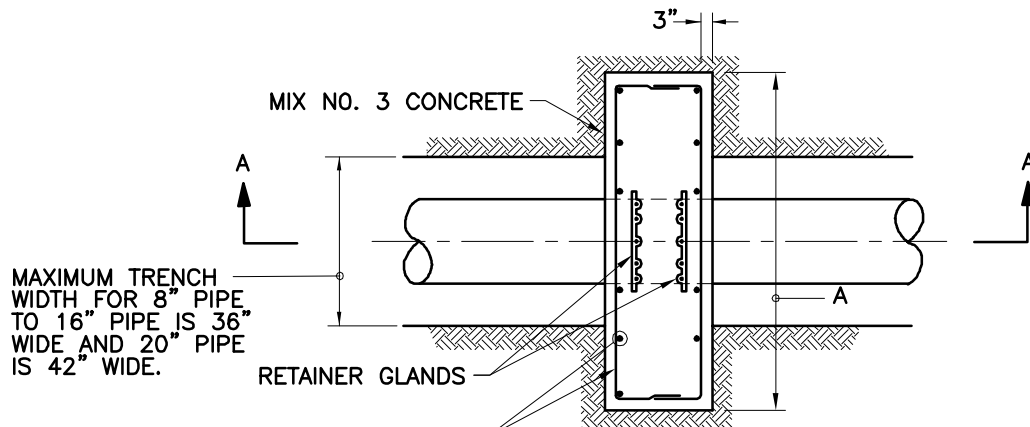
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STANDARD NO.
 BC 863.01

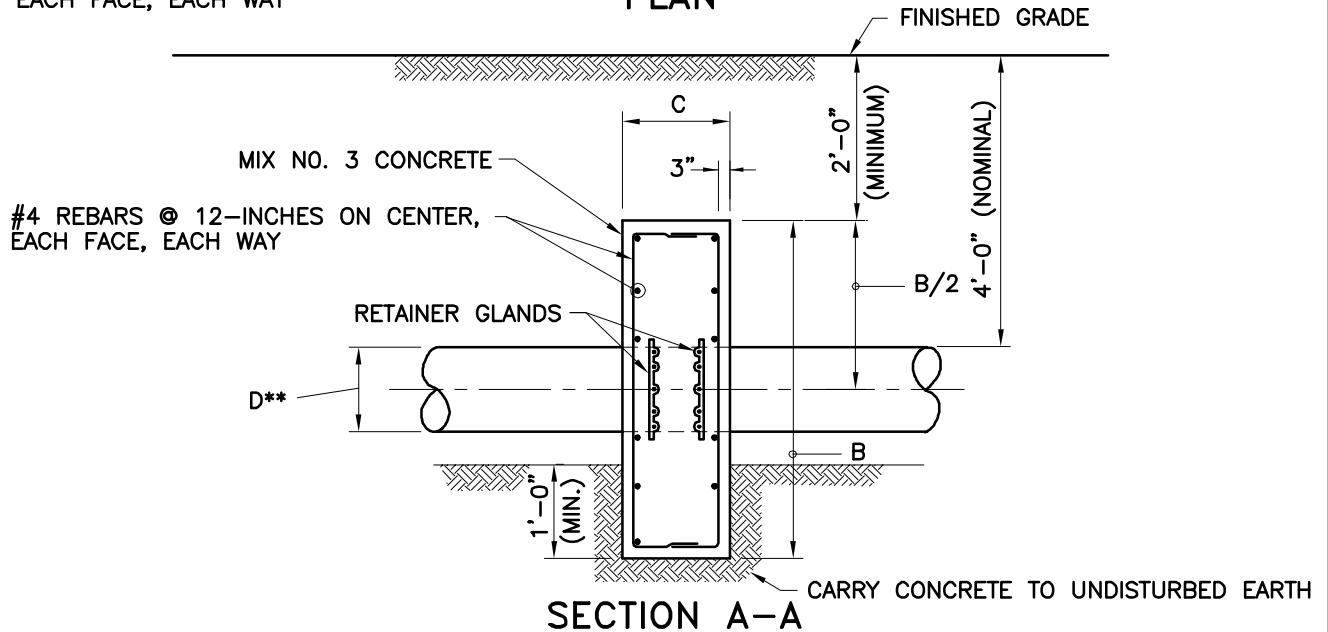
SCALE : NONE

SHEET 1 OF 1



#4 REBARS @ 12-INCHES ON CENTER,
EACH FACE, EACH WAY

PLAN



SECTION A-A

NOTES:

1. ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
2. THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - a. ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - b. OPERATING WATER PRESSURE = 150 PSI.
 - c. DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - d. ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
3. ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
4. ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- a. DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - b. DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.

IN-LINE THRUST BLOCK

PIPE SIZE					
D**	4"	6"	8"	10"	12"
A	4'-6"	5'-0"	5'-0"	6'-0"	6'-0"
B	2'-6"	3'-0"	4'-0"	4'-6"	5'-0"
C	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"
D** INDICATES NOMINAL DIAMETER PIPE SIZES					



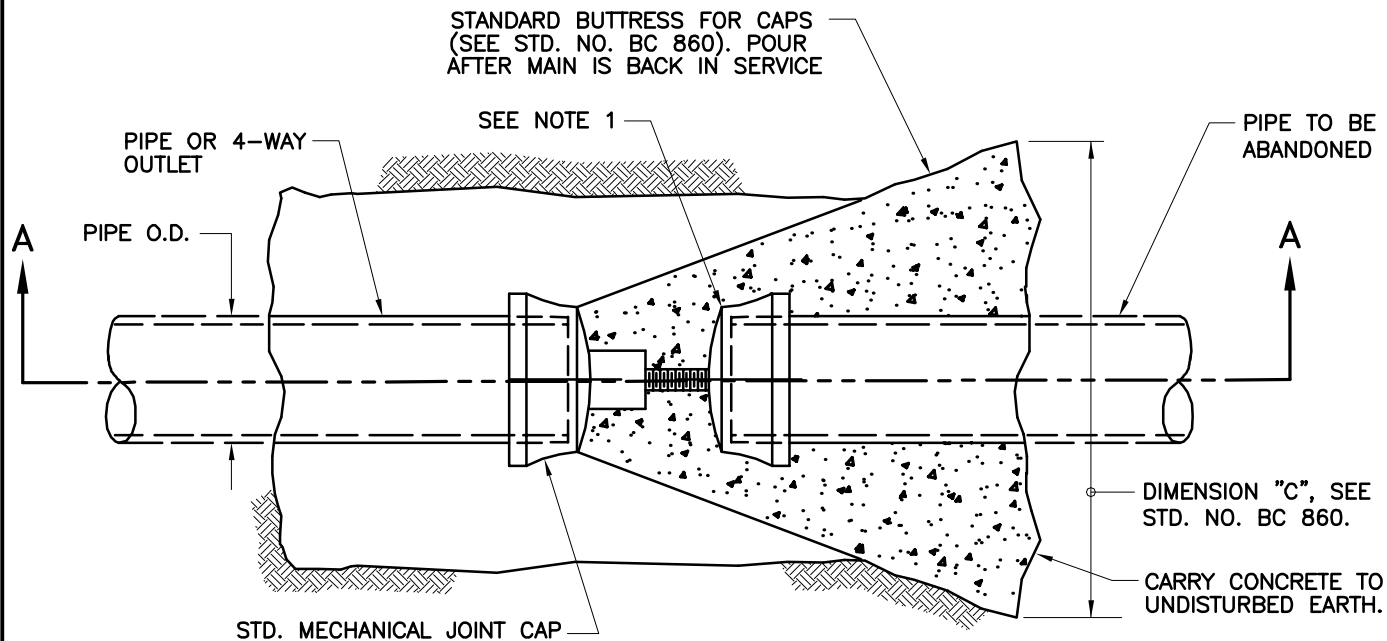
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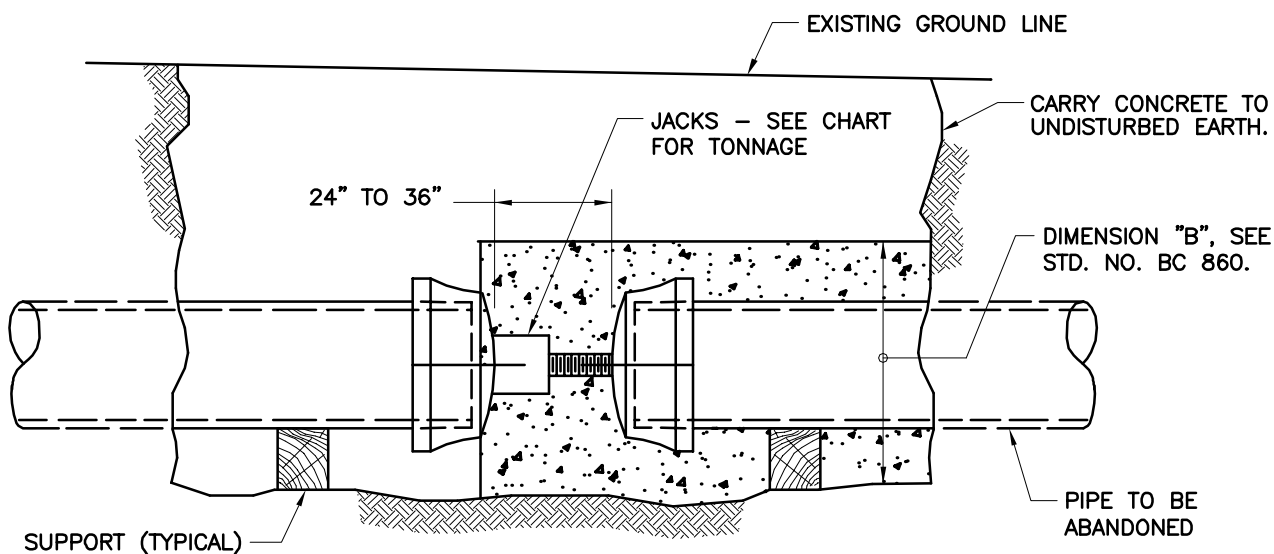
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IN-LINE THRUST BLOCKS
(FOR 4" - 12")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 864.01		
SCALE : NONE	SHEET 1 OF 1	



PLAN VIEW



SECTION A-A

NOTES:

1. GLANDS, BOLTS AND GASKETS NOT REQUIRED ON THIS CAP UNLESS LEAKAGE IS PRESENT IN ABANDONED PIPE. FOR CAP DIAMETER >12", JACK LOAD WITH BLOCKING ON CAPS.
2. O.D. MEASURED IN INCHES.
3. IN LIEU OF JACK, STEEL BLOCKING OF SAME CAPACITY MAY BE USED.

JACK TONNAGE CHART

JACK TONNAGE AT 100 PSI	$\frac{O.D.^2}{25}$ TONS
JACK TONNAGE AT 150 PSI	$\frac{O.D.^2}{16}$ TONS
JACK TONNAGE AT 200 PSI	$\frac{O.D.^2}{12}$ TONS



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DOUBLE CAPS, JACK, AND BUTTRESS
(FOR D.I. AND C.I. PIPE ONLY)

ISSUED

REVISED

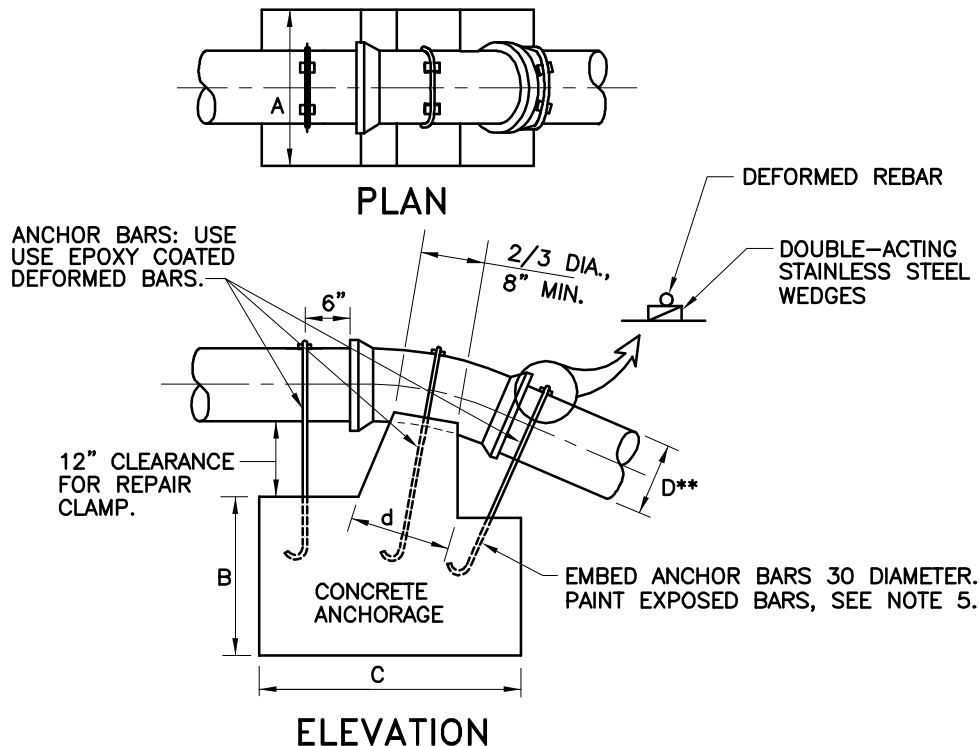
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3 / 2008

STANDARD NO.
BC 865.01

SCALE : NONE

SHEET 1 OF 1



ANCHORAGES FOR UPPER VERTICAL BENDS								
	PIPE SIZE							
	D**	4"	6"	8"	10"	12"	16"	20"
1/32 BEND	A	1'-6"	2'-0"	2'-0"	3'-0"	3'-6"	4'-6"	5'-0"
	B	2'-0"	2'-0"	3'-0"	3'-0"	3'-0"	3'-6"	4'-6"
	C	2'-6"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"
1/16 BEND	A	2'-6"	2'-6"	3'-6"	4'-0"	4'-6"	5'-6"	6'-0"
	B	3'-0"	2'-6"	3'-0"	3'-0"	3'-6"	4'-6"	5'-6"
	C	3'-0"	3'-6"	3'-6"	4'-6"	5'-0"	5'-6"	6'-6"
1/8 BEND	A	3'-6"	3'-6"	4'-0"	5'-0"	6'-0"	7'-0"	8'-0"
	B	3'-6"	3'-6"	4'-0"	4'-0"	4'-6"	5'-6"	6'-6"
	C	3'-6"	3'-6"	4'-6"	5'-6"	6'-0"	7'-0"	8'-0"

D** INDICATES NOMINAL DIAMETER PIPE SIZES

EPOXY COATED ANCHOR BARS			
PIPE SIZE	1/32 BEND	1/16 BEND	1/8 BEND
6"	3-#6	3-#6	3-#6
8"	3-#6	3-#6	3-#6
10"	3-#6	3-#6	3-#6
12"	3-#6	3-#6	3-#6
16"	3-#6	3-#6	3-#6
20"	3-#6	3-#6	3-#6

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.

- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
- DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



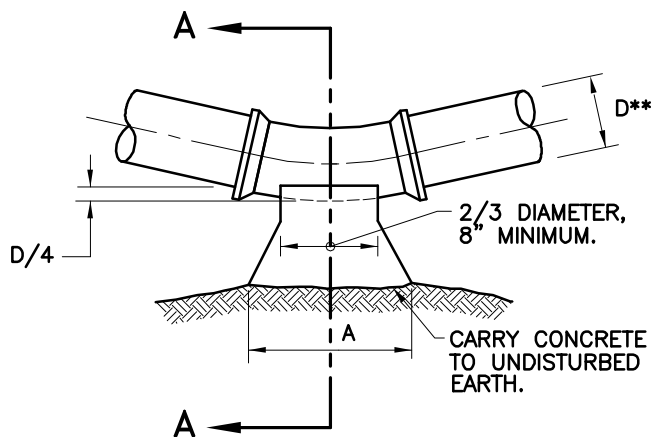
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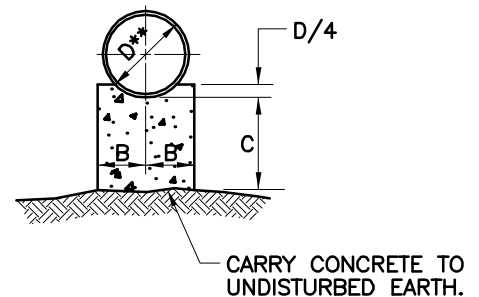
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ANCHORAGES FOR
UPPER VERTICAL BENDS
(FOR 4" - 20")

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 866.01		
SCALE : NONE	SHEET 1 OF 1	



ELEVATION



SECTION A-A

BUTTRESS FOR LOWER VERTICAL BENDS								
	PIPE SIZE							
	D**	4"	6"	8"	10"	12"	16"	20"
1/32 BEND	A	1'-0"	1'-0"	1'-6"	1'-6"	1'-6"	2'-0"	3'-0"
	B	6"	6"	6"	9"	9"	1'-0"	1'-0"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
1/16 BEND	A	1'-0"	1'-6"	2'-0"	2'-0"	2'-6"	3'-0"	4'-0"
	B	6"	6"	9"	1'-0"	1'-0"	1'-3"	1'-6"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"
1/8 BEND	A	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	5'-0"
	B	6"	9"	1'-0"	1'-0"	1'-3"	2'-0"	2'-3"
	C	1'-0"	1'-0"	1'-0"	1'-0"	1'-6"	1'-6"	2'-0"
D** INDICATES NOMINAL DIAMETER PIPE SIZES								

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.

- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
- DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



APPROVED :

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HEAD, BUREAU OF WATER AND WASTEWATER
[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

BUTTRESS FOR
LOWER VERTICAL BENDS
(FOR 4" - 20")

ISSUED

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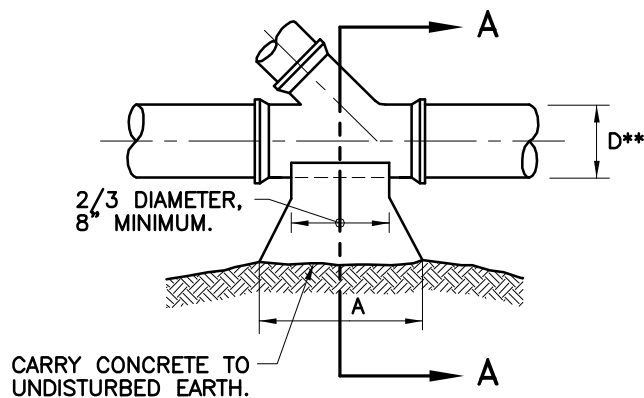
REVISED

3 / 2008

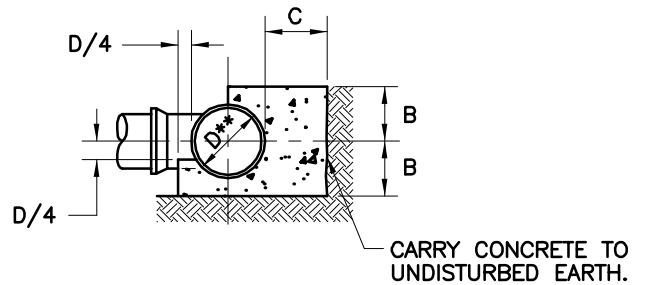
STANDARD NO.
BC 867.01

SCALE : NONE

SHEET 1 OF 1



PLAN



SECTION A-A

BUTTRESS FOR WYE CONNECTION							
PIPE SIZE							
D**	4"	6"	8"	10"	12"	16"	20"
A	1'-6"	1'-6"	2'-0"	2'-6"	3'-0"	4'-0"	4'-6"
B	1'-0"	1'-0"	1'-0"	1'-6"	2'-0"	2'-0"	2'-6"
C	1'-0"	1'-0"	1'-0"	2'-0"	2'-6"	3'-0"	4'-0"
D** INDICATES NOMINAL DIAMETER PIPE SIZES							

NOTES:

- ALL CONCRETE TO BE MIX 3, $f'_c = 3,500$ PSI AT 28 DAYS.
- THE MINIMUM DIMENSION AS SHOWN IS BASED ON THE FOLLOWING CONDITIONS AND LIMITATIONS:
 - ALLOWABLE SOIL BEARING CAPACITY = 2,000 PSF.
 - OPERATING WATER PRESSURE = 150 PSI.
 - DEPTH FROM FINISHED GRADE TO TOP OF PIPE ASSUMED TO EQUAL 4'-0" OR DEEPER.
 - ELEVATION OF GROUNDWATER TABLE ASSUMED TO BE BELOW BOTTOM OF THE CONCRETE BLOCK.
- ALL DIMENSIONS ARE MINIMUM EXCEPT WHERE LARGER DIMENSION WILL INTERFERE WITH THE PIPE JOINTS OR NOT FACILITATE BOLT REMOVAL ON MECHANICAL JOINTS.
- ALL DIMENSIONS ARE FOR DUCTILE IRON PIPE FITTINGS OR PVC PIPE WITH DUCTILE IRON PIPE FITTINGS. BUTTRESSES FOR HDPE PIPE AND FITTINGS SHALL BE CONSIDERED SITE SPECIFIC AND SHALL REQUIRE BALTIMORE CITY APPROVAL.

SITE SPECIFIC DESIGN CRITERIA:

- IF THE ABOVE STATED CONDITIONS AND LIMITATIONS ARE NOT MET, OR THE PIPE DIAMETER IS GREATER THAN 20", A SITE SPECIFIC DESIGN WILL BE REQUIRED FOR APPROVAL.
- DESIGN THRUST FORCE SHALL BE CALCULATED BASED ON THE OUTSIDE DIAMETER OF THE PIPE.
 - DESIGN THRUST FORCES = CALCULATED THRUST X 1.5 FACTOR OF SAFETY.



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER



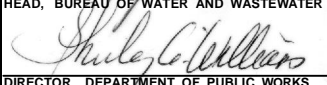
BUTTRESS FOR
WYE CONNECTION
(FOR 4" - 20")

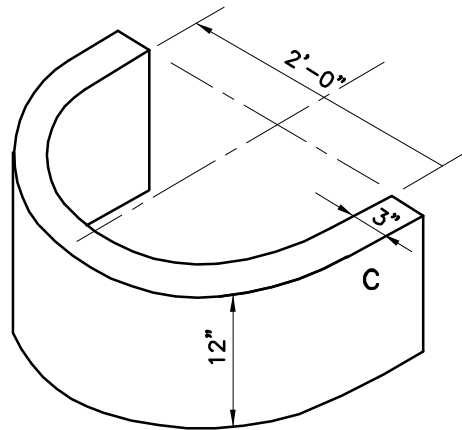
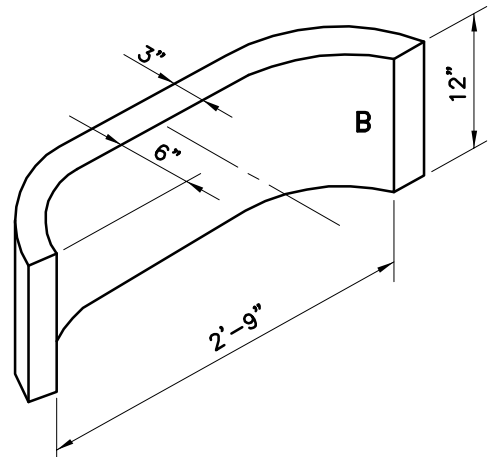
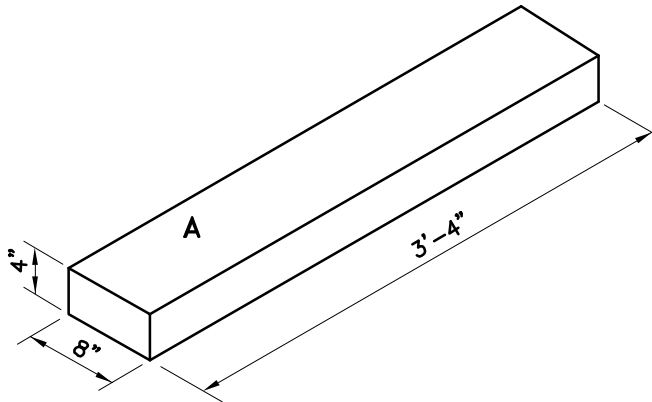
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 868.01		
SCALE : NONE	SHEET 1 OF 1	

4" VALVE (SMALL VAULT)							6" VALVE (SMALL VAULT)						
COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER	COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER
	A	B	C	D	E			A	B	C	D	E	
1'-6" TO 1'-9"	2	2	0	2	1	1	2'-0" TO 2'-1"	2	2	2	0	1	1
1'-10" TO 2'-3"	2	2	2	0	1	1	2'-4" TO 2'-7"	2	2	2	2	1	1
2'-4" TO 2'-9"	2	2	2	2	1	1	2'-10" TO 3'-1"	2	2	2	4	1	1
2'-10" TO 3'-3"	2	2	2	4	1	1	3'-4" TO 3'-7"	2	2	4	2	1	1
3'-4" TO 3'-9"	2	2	4	2	1	1	3'-10" TO 4'-1"	2	2	4	4	1	1
3'-10" TO 4'-3"	2	2	4	4	1	1	4'-4" TO 4'-7"	2	2	4	6	1	1
4'-4" TO 4'-9"	2	2	4	6	1	1	4'-10" TO 5'-1"	2	2	6	4	1	1
8" VALVE (SMALL VAULT)							10" VALVE (LARGE VAULT)						
COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER	COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER
	A	B	C	D	E			A	B	C	D	E	
1'-11"	2	2	2	0	1	1	2'-3" TO 2'-9"	4	2	2	2	2	1
2'-3" TO 2'-5"	2	2	2	2	1	1	2'-9" TO 3'-3"	4	2	2	4	2	1
2'-9" TO 2'-11"	2	2	2	4	1	1	3'-3" TO 3'-9"	4	2	2	6	2	1
3'-3" TO 3'-5"	2	2	4	2	1	1	3'-9" TO 4'-3"	4	2	4	4	2	1
3'-9" TO 3'-11"	2	2	4	4	1	1	4'-3" TO 4'-9"	4	2	4	6	2	1
4'-3" TO 4'-5"	2	2	4	6	1	1	4'-9" TO 5'-3"	4	2	4	8	2	1
4'-9" TO 4'-11"	2	2	6	4	1	1							
12" VALVE (LARGE VAULT)													
COVER ON MAIN	STANDARD CONCRETE SECTIONS					FRAME AND COVER							
	A	B	C	D	E								
2'-6" TO 2'-7"	4	2	2	2	2	1							
2'-9" TO 3'-1"	4	2	2	4	2	1							
3'-3" TO 3'-7"	4	2	2	6	2	1							
3'-9" TO 4'-1"	4	2	4	4	2	1							
4'-3" TO 4'-7"	4	2	4	6	2	1							
4'-9" TO 5'-1"	4	2	4	8	2	1							

NOTE:

FOR 10" AND 12" TAPPING SLEEVE AND VALVES,
"F" SECTION SHALL BE SUBSTITUTED FOR "E" SECTION.

	APPROVED :  HEAD, BUREAU OF WATER AND WASTEWATER	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED 3 / 2008	REVISED 	REVISED
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS	TABLE OF SECTIONS REQUIRED FOR CONCRETE VALVE VAULTS	STANDARD NO. BC 869.01		
			SCALE : NONE SHEET 1 OF 1		



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[Signature]
HEAD, BUREAU OF WATER AND WASTEWATER
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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD SECTIONS FOR
SMALL CONCRETE VAULTS

ISSUED

REVISED

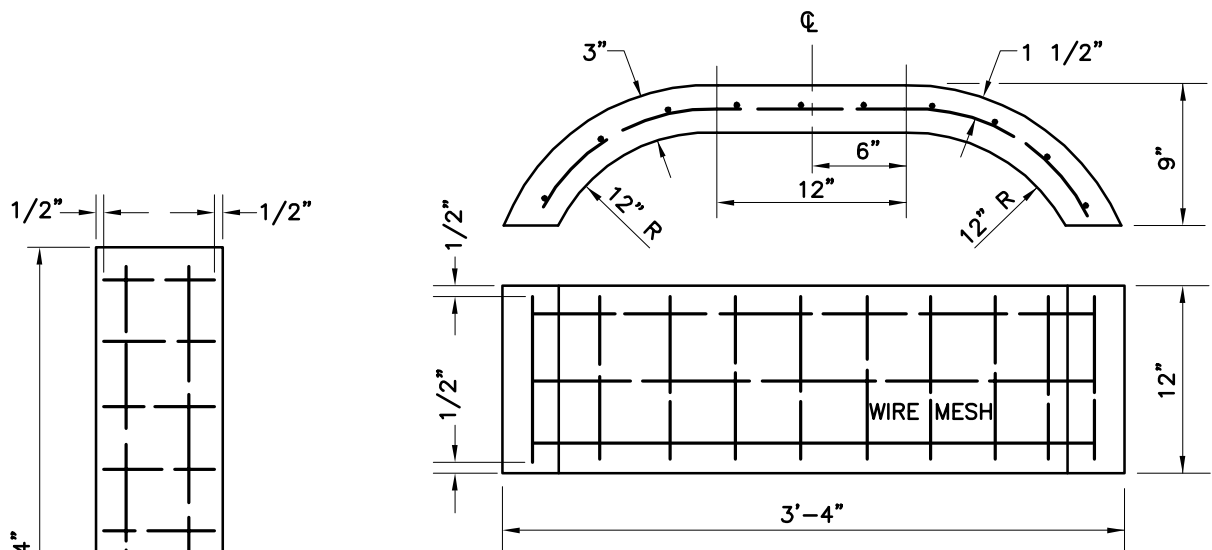
REVISED

3 / 2008

STANDARD NO.
BC 870.01

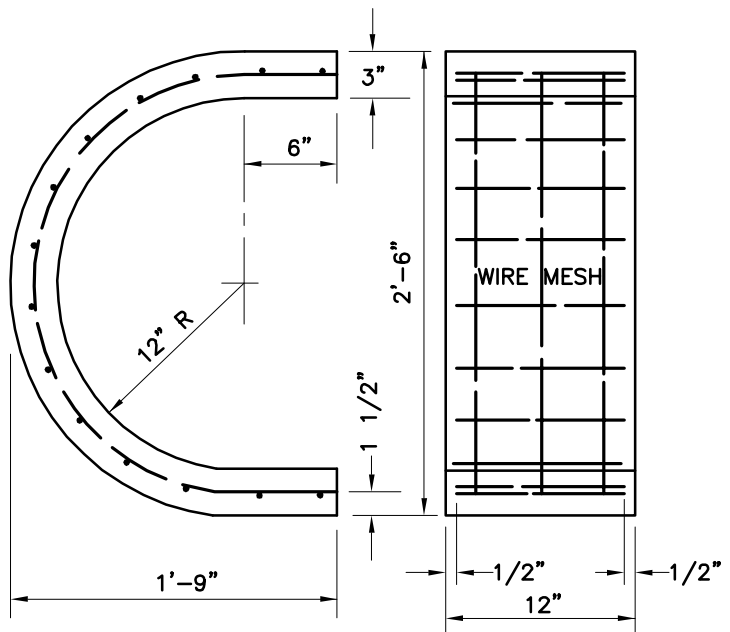
SCALE : NONE

SHEET 1 OF 3



"A" SECTION

"B" SECTION



"C" SECTION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. WIRE MESH SHALL BE 4"x4" NO. 6 WIRE.



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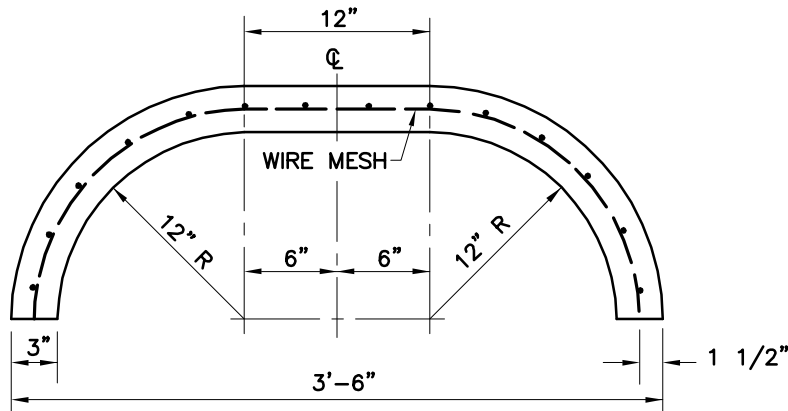
 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

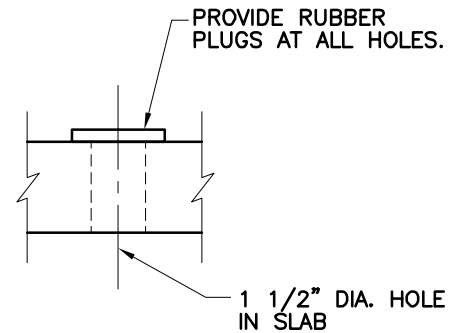
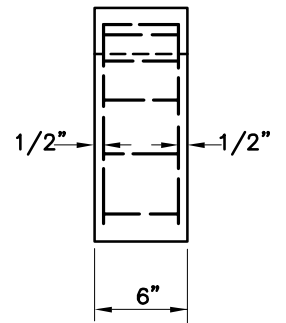
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

DETAIL OF SMALL
 SECTIONAL CONCRETE VAULT

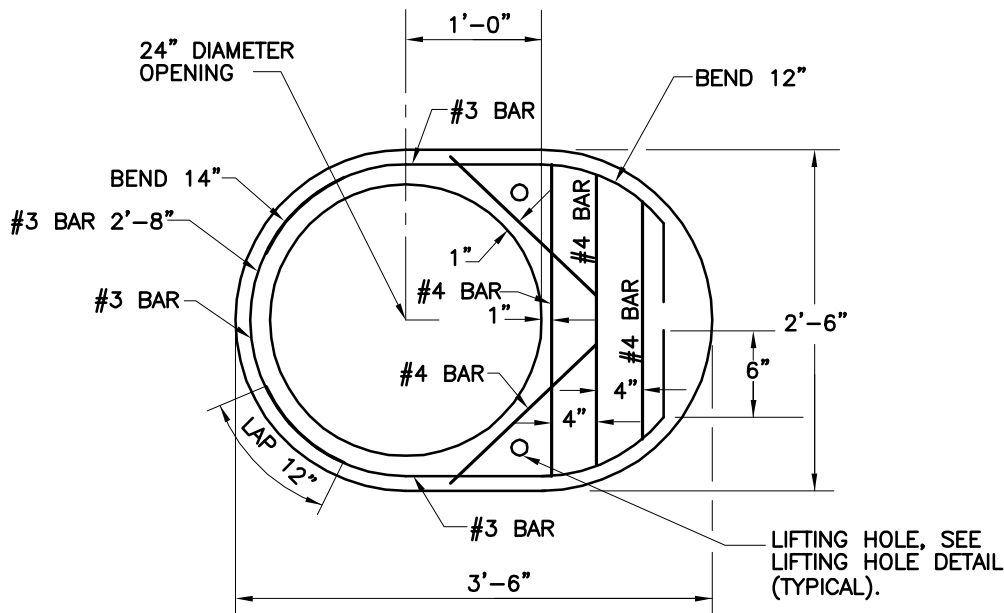
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 870.01		
SCALE : NONE		SHEET 2 OF 3



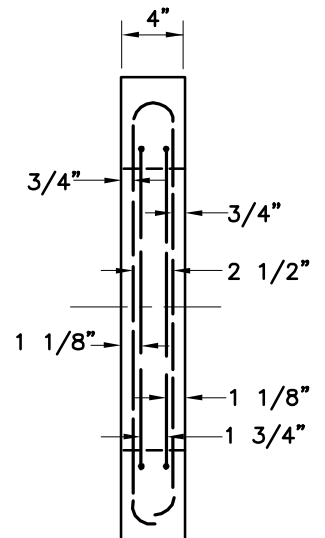
"D" SECTION



LIFTING HOLE DETAIL



"E" SECTION



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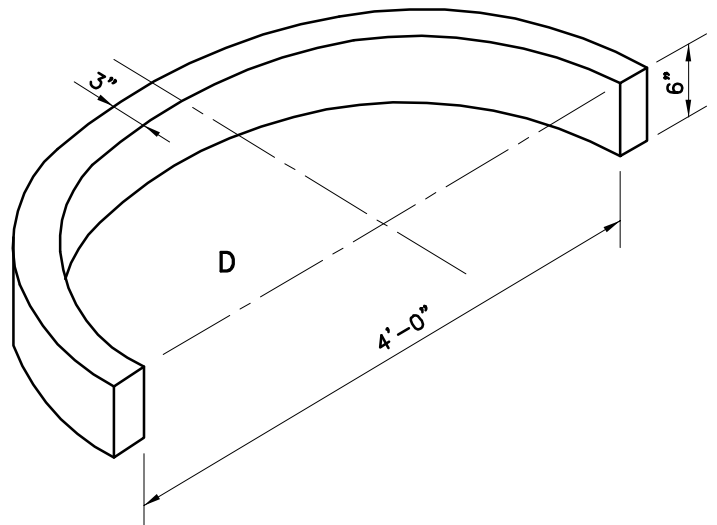
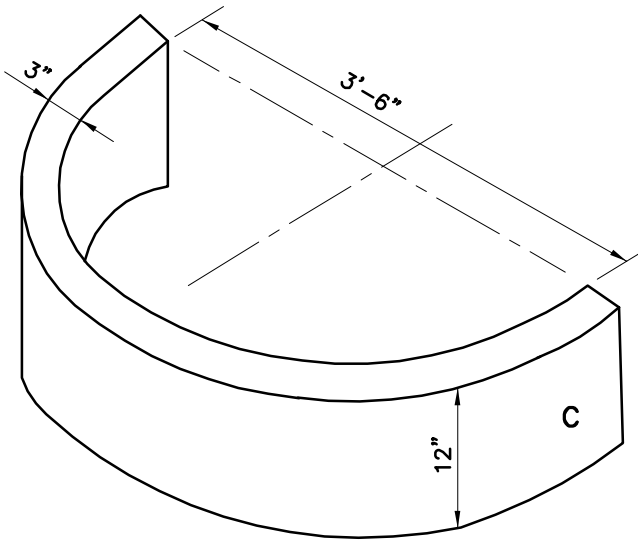
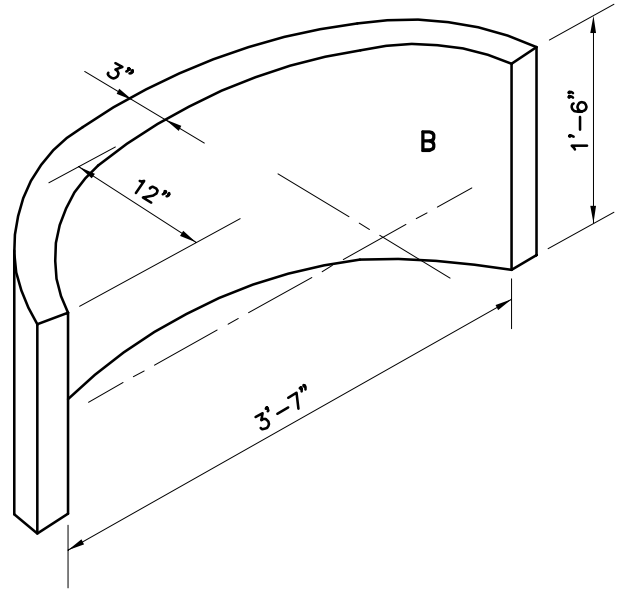
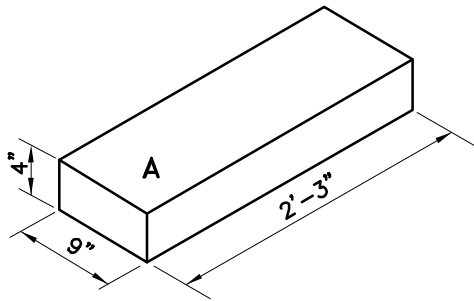
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CITY OF BALTIMORE
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 BUREAU OF WATER AND WASTEWATER

DETAILS OF "D" AND "E" SECTIONS -
 SMALL SECTIONAL CONCRETE VAULT

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 870.01		
SCALE : NONE		SHEET 3 OF 3



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD SECTIONS FOR
LARGE SECTIONAL CONCRETE VAULTS

ISSUED

REVISED

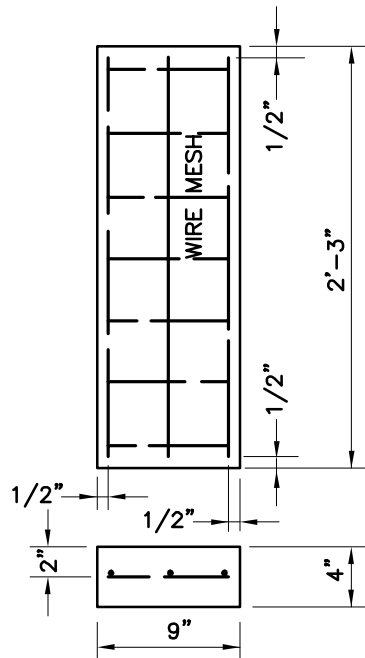
REVISED

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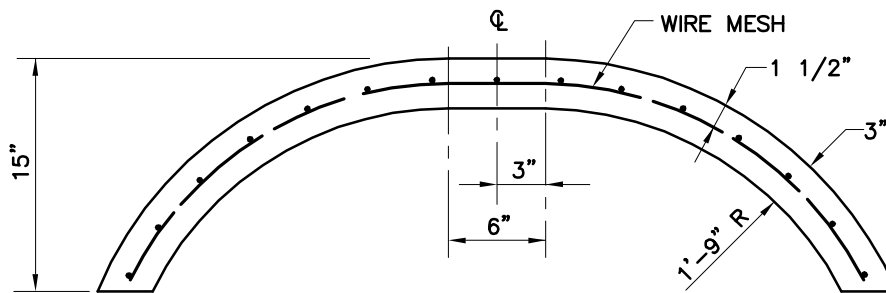
STANDARD NO.
BC 871.01

SCALE : NONE

SHEET 1 OF 4



"A" SECTION



"B" SECTION

NOTES:

1. CONCRETE SHALL BE MIX 3.
2. WIRE MESH SHALL BE 4"x4" NO. 6 WIRE.



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
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DETAIL OF
LARGE SECTIONAL CONCRETE VAULT
("A" & "B" SECTIONS)

ISSUED

REVISED

REVISED


3 / 2008

STANDARD NO.
BC 871.01

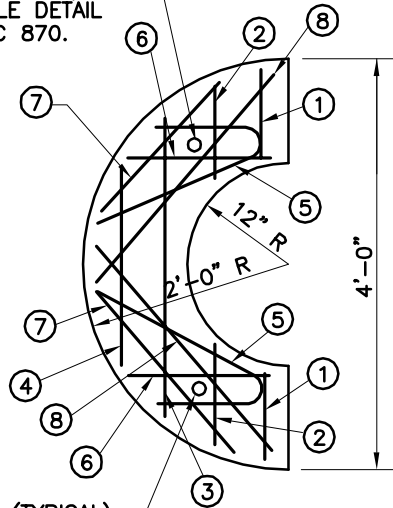
SCALE : NONE

SHEET 2 OF 4



	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER	ISSUED	REVISED	REVISED
	HEAD, BUREAU OF WATER AND WASTEWATER DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 871.01		
		DETAIL OF LARGE SECTIONAL CONCRETE VAULT ("C" & "D" SECTIONS)	SCALE : NONE		
			SHEET 3 OF 4		

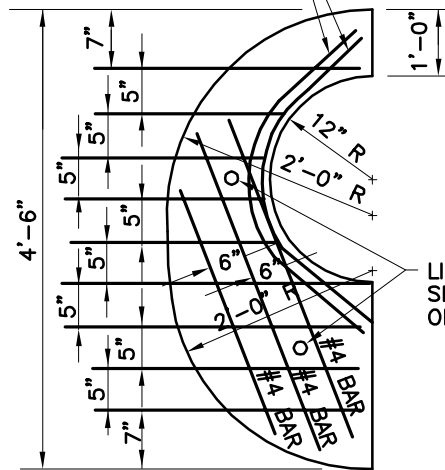
LIFTING HOLE (TYPICAL),
SEE LIFTING HOLE DETAIL
ON STD. NO. BC 870.



LIFTING HOLE (TYPICAL),
SEE LIFTING HOLE DETAIL
ON STD. NO. BC 870.

"E" SECTION

STRAIGHT BARS
ALL OTHERS HOOKED
(SEE TYPICAL DETAIL BELOW)

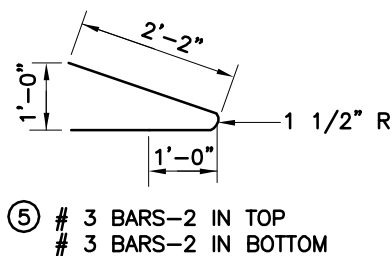


LIFTING HOLE (TYPICAL),
SEE LIFTING HOLE DETAIL
ON STD. NO. BC 870.

"F" SECTION

NOTES:

1. CONCRETE SHALL BE 5,000 PSI.
2. REINFORCING BARS SHALL BE $F_y=60,000$ PSI.



⑤ # 3 BARS—2 IN TOP
3 BARS—2 IN BOTTOM

⑥ = 1 3/4"
① ② ③ ④ = 2 1/2"

①	# 3 BARS 9" — 2 OF THIS
②	# 3 BARS 0" — 2 OF THIS
③	# 3 BARS 3'-3" — 1 OF THIS
④	# 3 BARS 2'-3" — 1 OF THIS
⑥	# 3 BARS 15" — 2 OF THIS
⑦	# 4 BARS 2'-0" — 2 IN BOTTOM
⑧	# 4 BARS 2'-9" — 2 IN BOTTOM

"E" SECTION & "F" SECTION — LARGE VAULT TOP SLAB



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DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

"E" SECTION & "F" SECTION
LARGE CONCRETE VAULT
TOP SLAB

ISSUED

REVISED

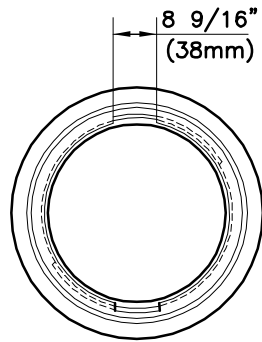
REVISED

3 / 2008

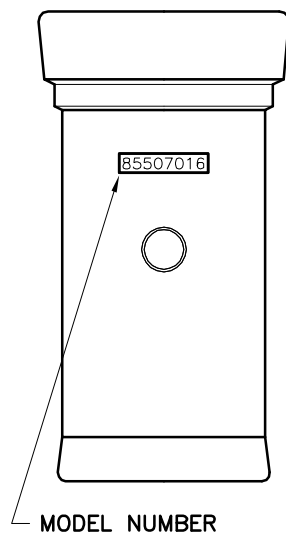
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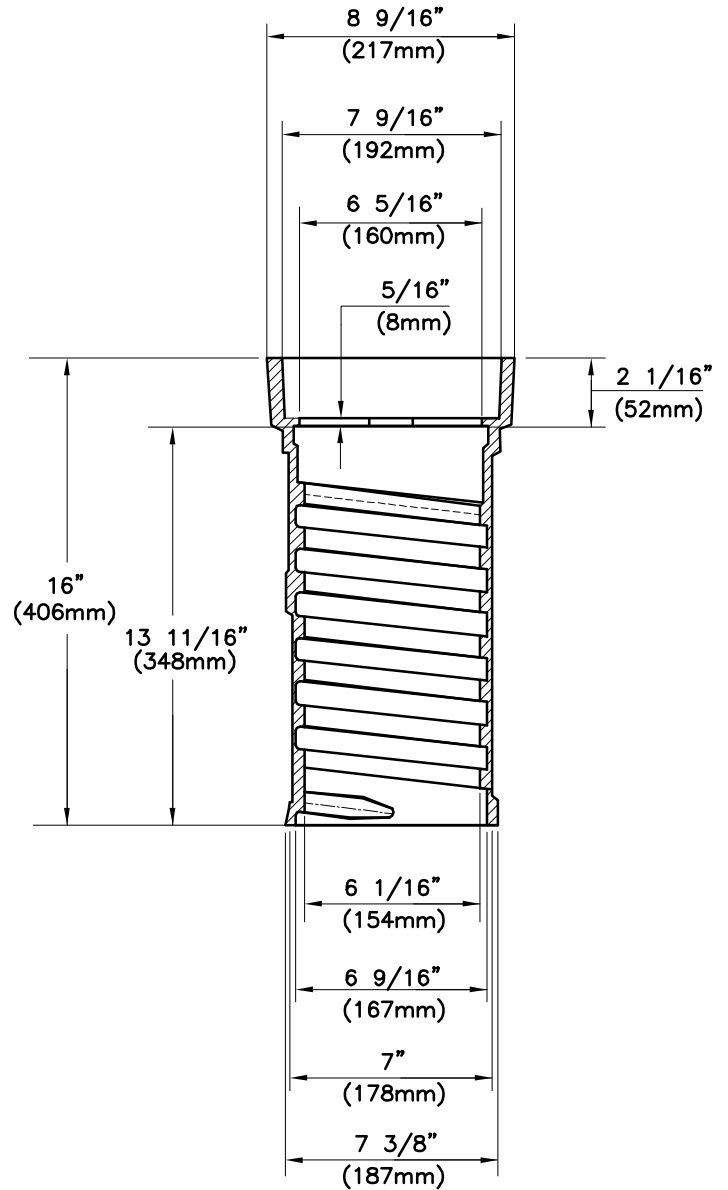
SHEET 4 OF 4



TOP VIEW


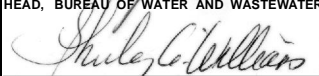


SIDE VIEW



SECTION

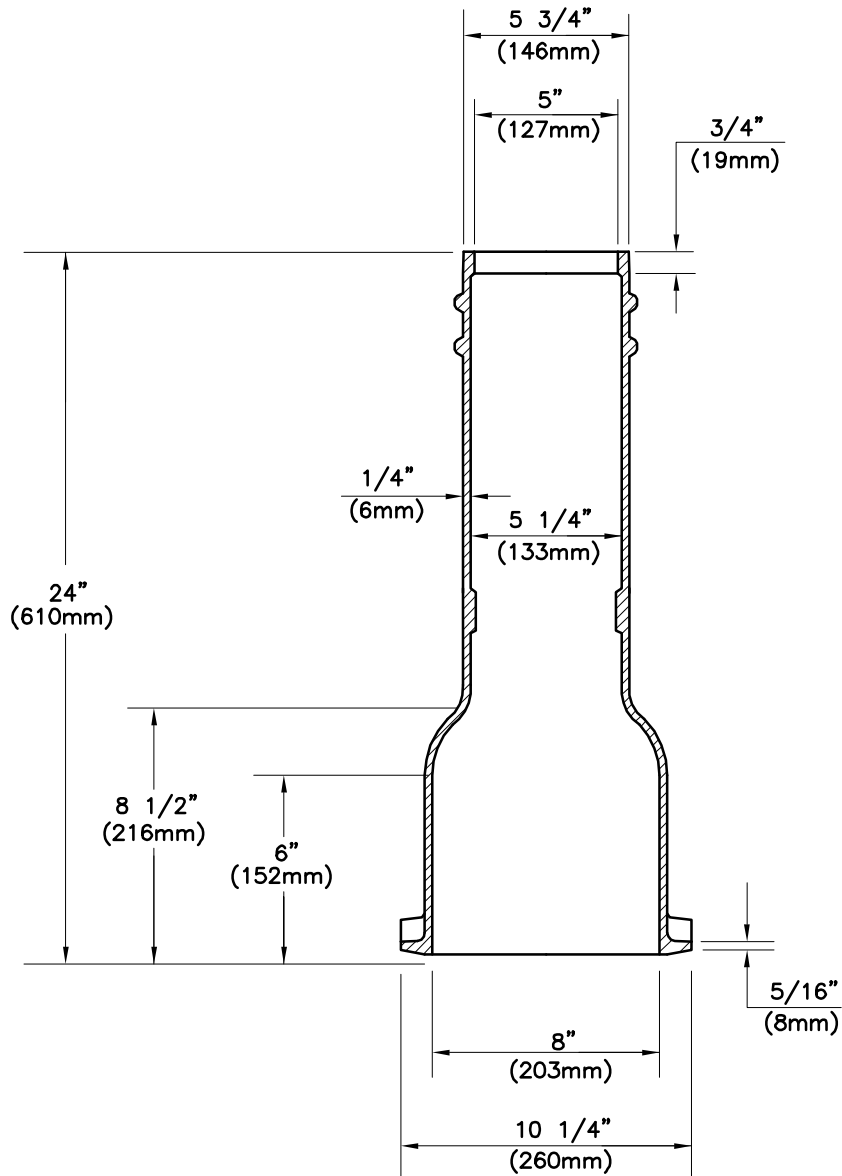


APPROVED :

 HEAD, BUREAU OF WATER AND WASTEWATER

 DIRECTOR, DEPARTMENT OF PUBLIC WORKS

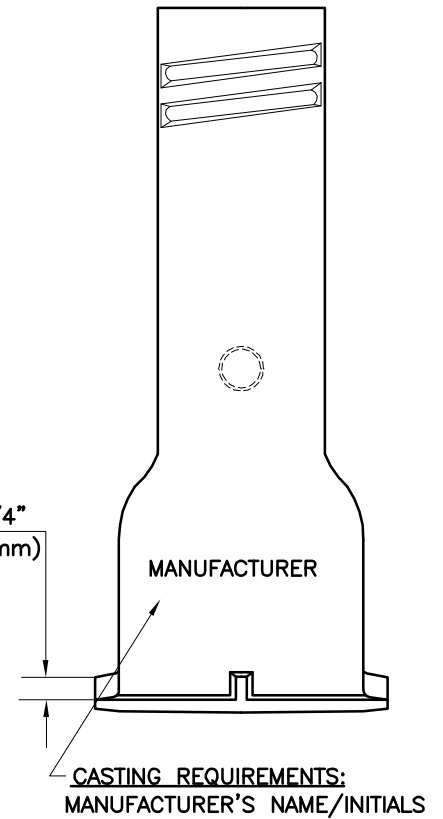
CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

7 1/2" ROADWAY BOX TOP

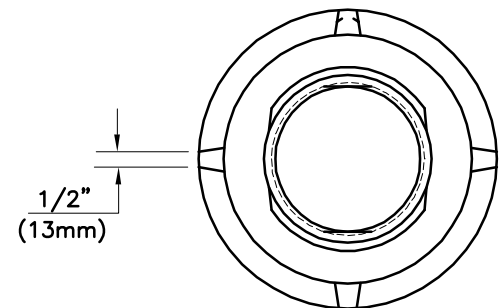
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE : NONE		SHEET 1 OF 6



SECTION


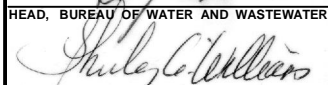


SIDE VIEW



BOTTOM VIEW



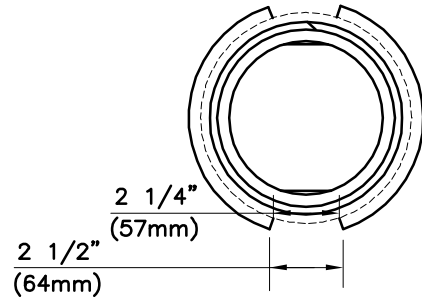
APPROVED :

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 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

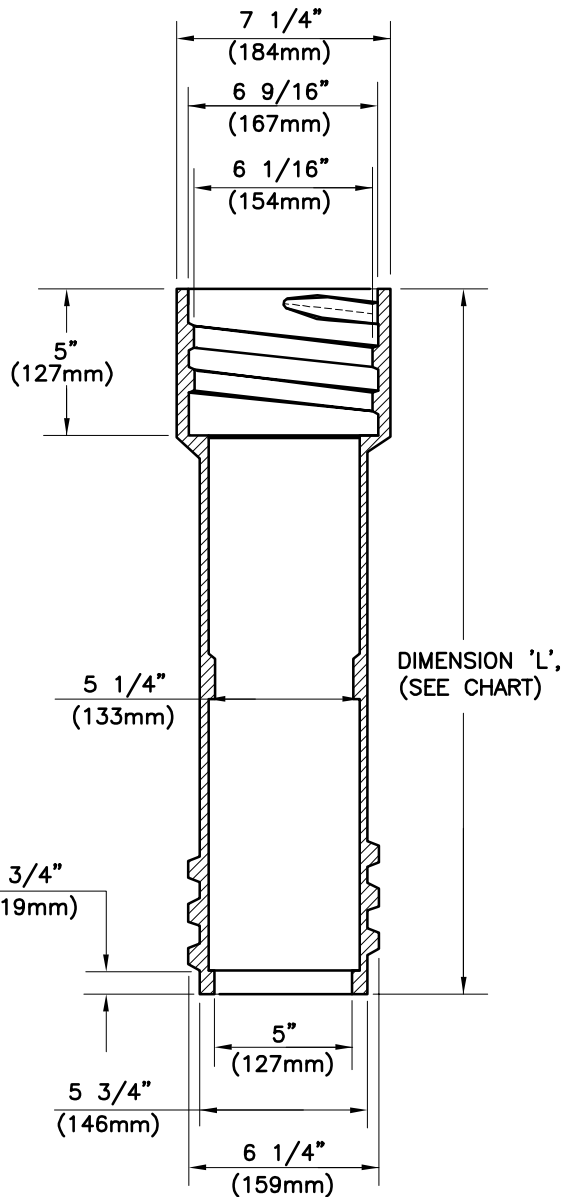
7 1/2" ROADWAY BOX BOTTOM

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE : NONE		SHEET 2 OF 6

EXTENSION MODEL	DIMENSION 'L'
14-INCH EXTENSION	18" (457mm)
18-INCH EXTENSION	24" (610mm)
24-INCH EXTENSION	30" (762mm)

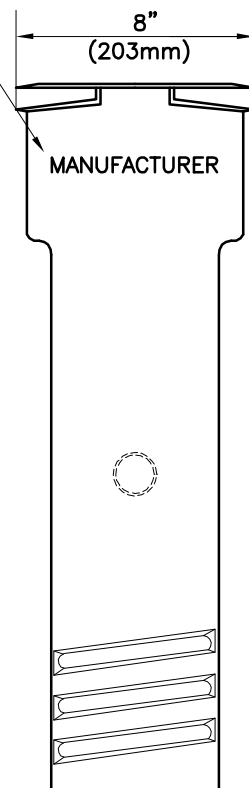


SIDE VIEW



SECTION

CASTING REQUIREMENTS:
MANUFACTURER'S NAME/INITIALS



SIDE VIEW



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[Signature]
DIRECTOR, DEPARTMENT OF PUBLIC WORKS

CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

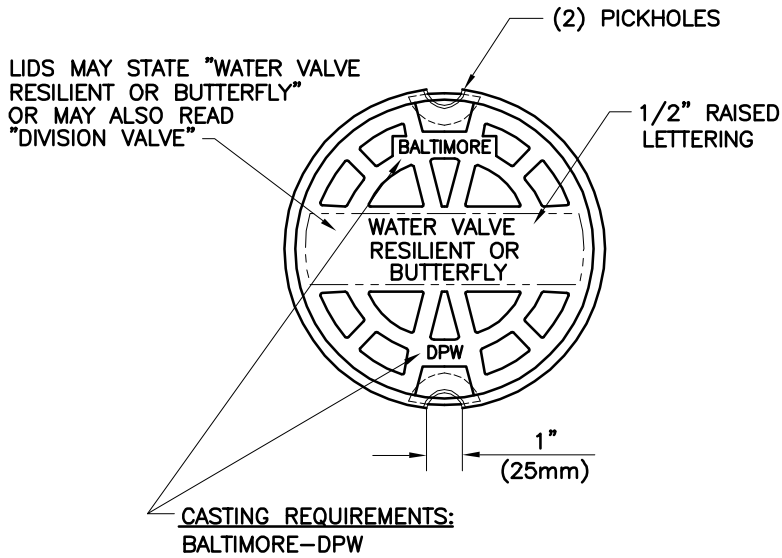
7 1/2" ROADWAY BOX EXTENSION

ISSUED	REVISED	REVISED
3 / 2008		

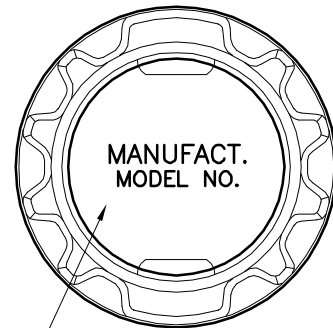
STANDARD NO.
BC 872.01

SCALE : NONE

SHEET 3 OF 6

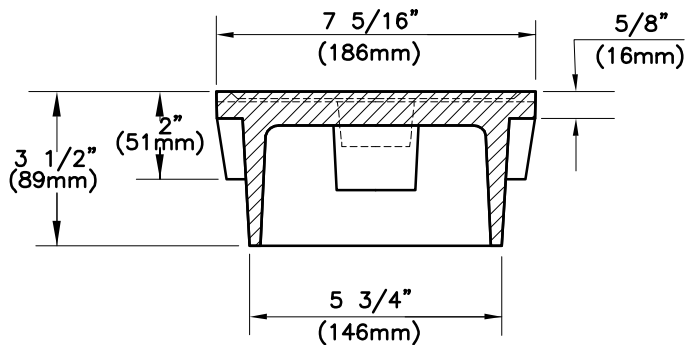


TOP VIEW

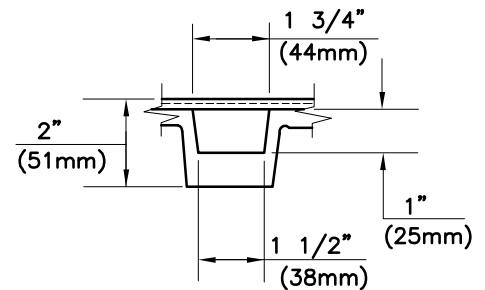


CASTING REQUIREMENTS:
MANUFACTURER'S NAME/INITIALS
MODEL NUMBER


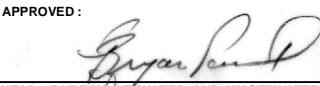

BOTTOM VIEW

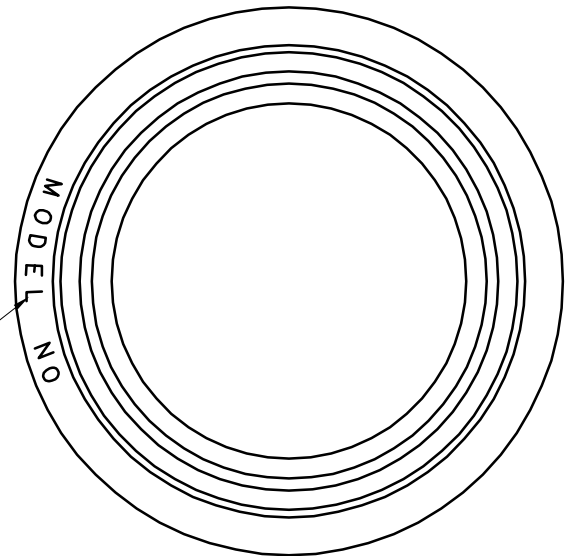
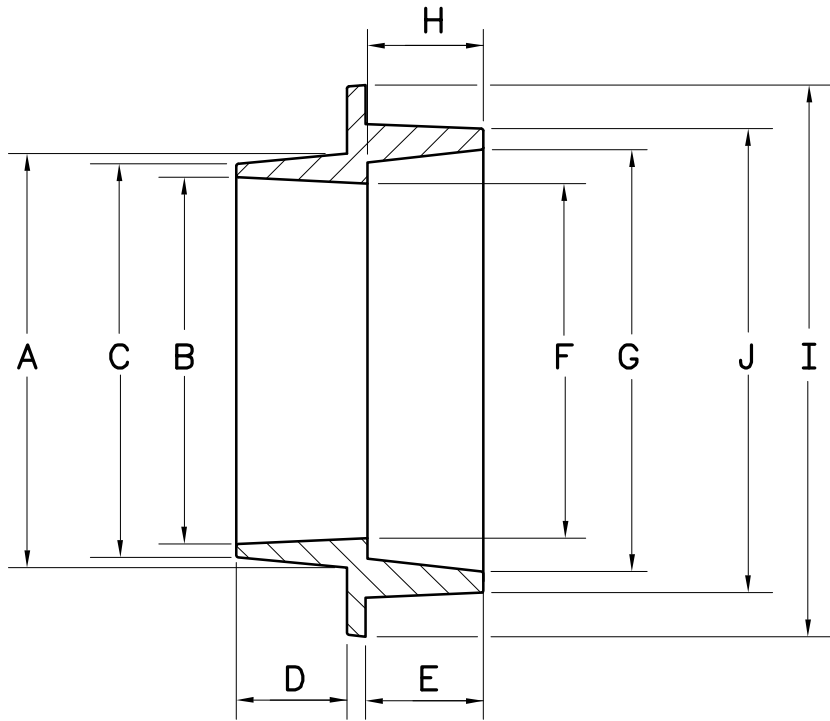


SECTION



PICK HOLE DETAIL

	APPROVED:	<p>CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER</p> <p>7 1/2" ROADWAY BOX LID (ON RESILIENT OR BUTTERFLY VALVE)</p>	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER		3 / 2008		
	 DIRECTOR, DEPARTMENT OF PUBLIC WORKS		<p>STANDARD NO. BC 872.01</p> <p>SCALE : NONE SHEET 4 OF 6</p>		



CASTING REQUIREMENTS:
MODEL NUMBER

VALVE BOX RISER CHART

SIZE (INCHES)	DIMENSIONS – INCHES (MILLIMETERS)										ESTIMATED RISER WEIGHT
	A	B	C	D	E	F	G	H	I	J	
1 1/2"	7 1/2" (191mm)	7 1/16" (180mm)	6 7/16" (164mm)	2" (51mm)	1 1/8" (29mm)	6 5/16" (161mm)	7 1/2" (190mm)	2 1/16" (52mm)	9 11/16" (247mm)	8 3/16" (208mm)	9 lbs (4kg)
2"	7 1/2" (191mm)	6 1/2" (166mm)	7 1/16" (180mm)	2" (51mm)	1 5/8" (41mm)	6 5/16" (161mm)	7 1/2" (190mm)	2 1/16" (52mm)	9 3/4" (248mm)	8 3/16" (208mm)	10 lbs (5kg)
2 1/2"	7 1/2" (191mm)	6 9/16" (167mm)	7" (178mm)	2" (51mm)	2 1/8" (54mm)	6 5/16" (161mm)	7 1/2" (190mm)	2 1/16" (52mm)	9 13/16" (249mm)	8 3/16" (208mm)	12 lbs (5kg)



APPROVED :

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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

1 1/2", 2", & 2 1/2" VALVE BOX RISER
(HEAVY DUTY)

ISSUED

REVISED

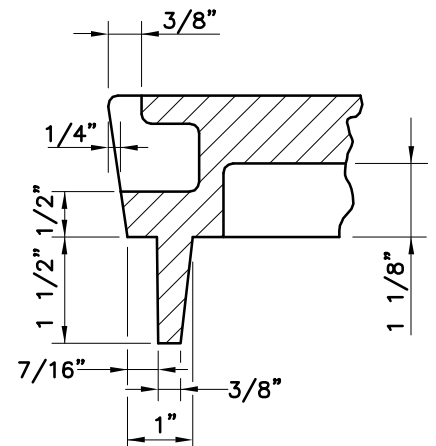
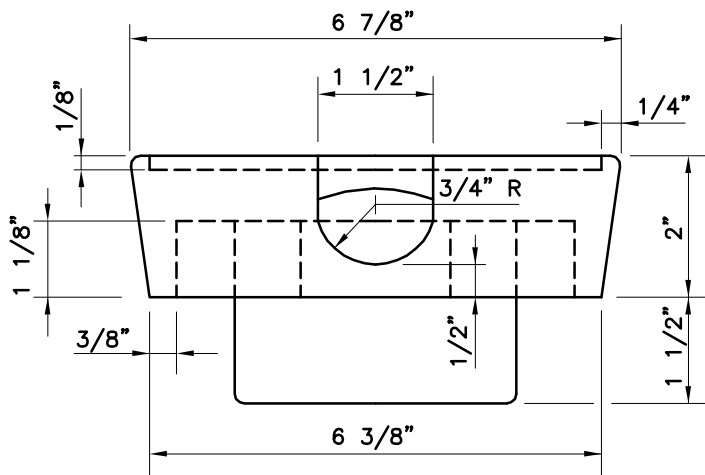
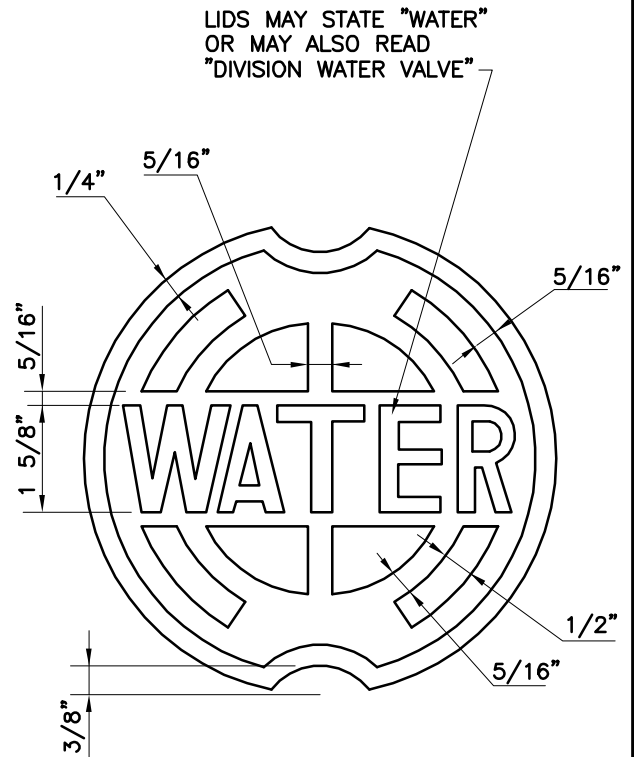
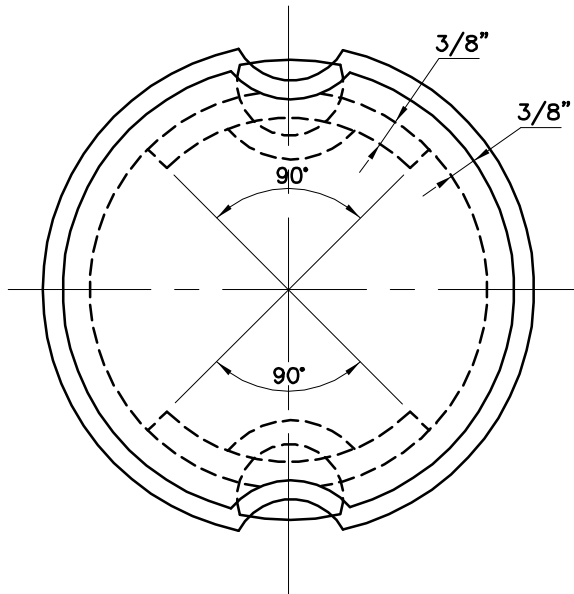
REVISED

3 / 2008

STANDARD NO.
BC 872.01

SCALE : NONE

SHEET 5 OF 6



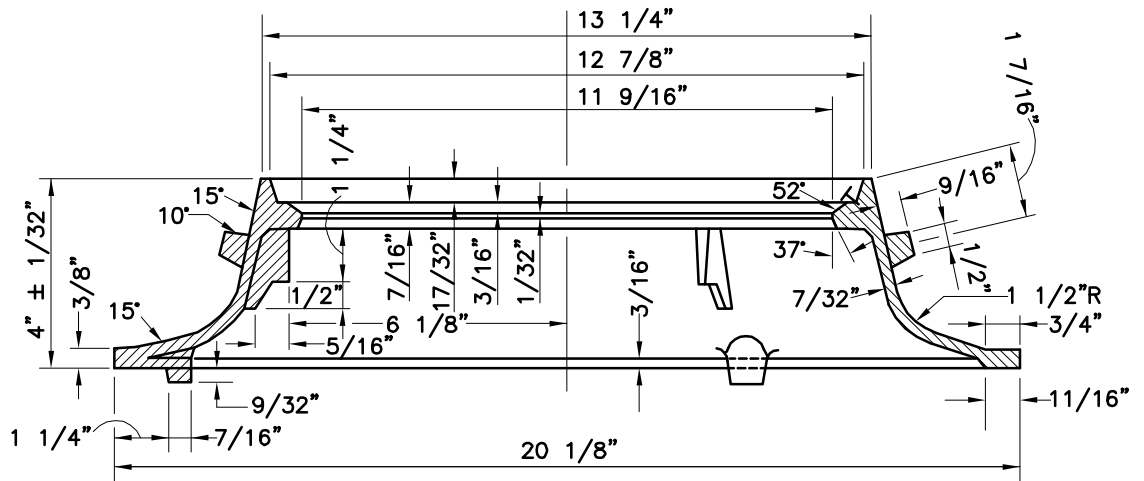
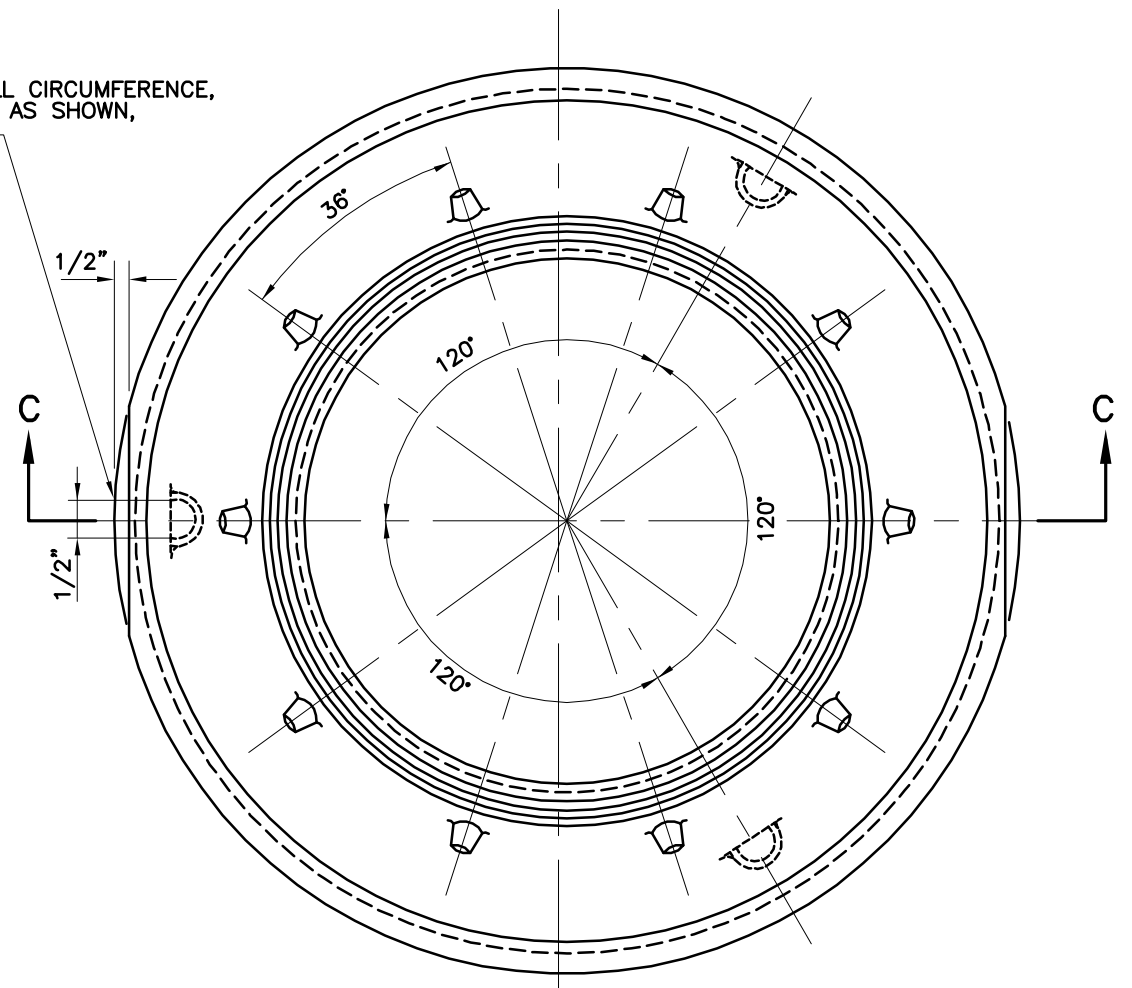
APPROVED: *[Signature]*
HEAD, BUREAU OF WATER AND WASTEWATER
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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 7 1/2" VALVE COVER - WATER

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 872.01		
SCALE : NONE		SHEET 6 OF 6

CASTING WITH FULL CIRCUMFERENCE,
OR SQUARE CUTS AS SHOWN,
IS ACCEPTABLE.



NOTES:

1. AVERAGE WEIGHT OF FRAME - 22 LBS.
2. MATERIAL SHALL BE CAST IRON,
21,000 PSI TENSILE STRENGTH.

SECTION C-C



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 12" METER FRAME

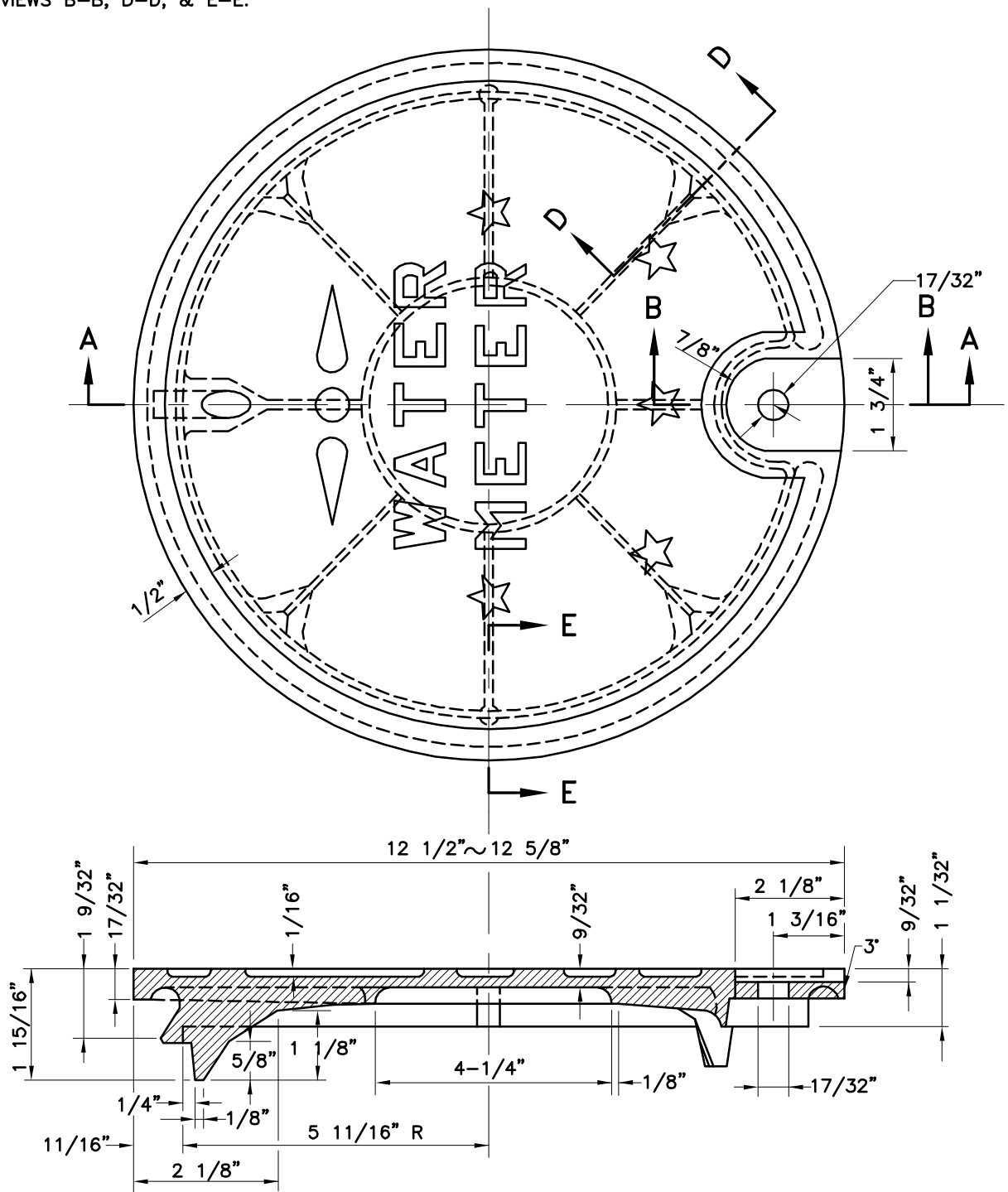
ISSUED	REVISED	REVISED
3 / 2008		

**STANDARD NO.
BC 873.01**

SCALE : NONE

SHEET 1 OF 3

SEE STD. NO. BC 863.03 FOR
SECTION VIEWS B-B, D-D, & E-E.



SECTION A-A

NOTE:

METER COVER MATERIAL SHALL BE CAST IRON
21,000 PSI TENSILE STRENGTH. WEIGHT=11LBS.



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CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 12" METER COVER

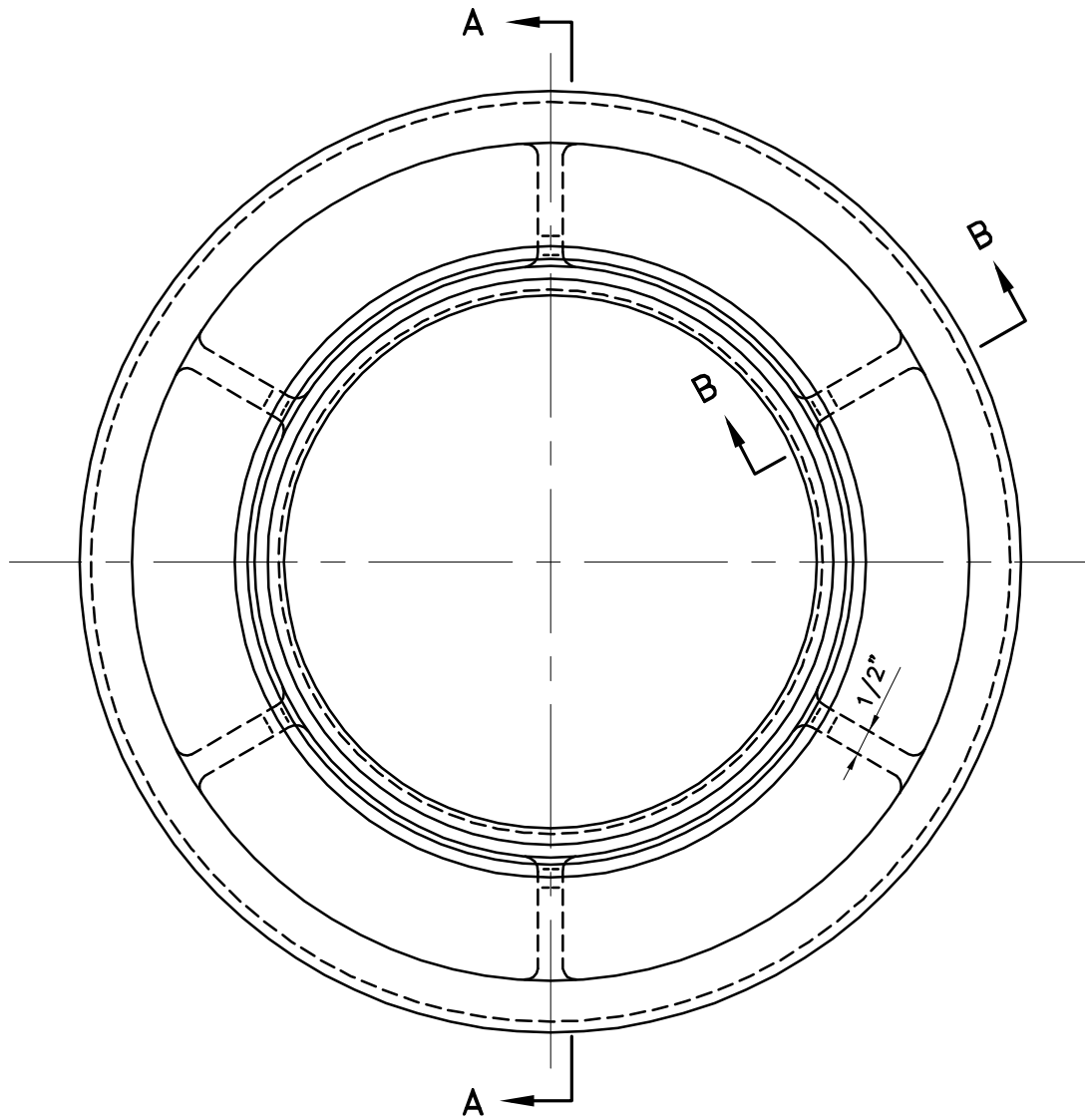
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 873.01

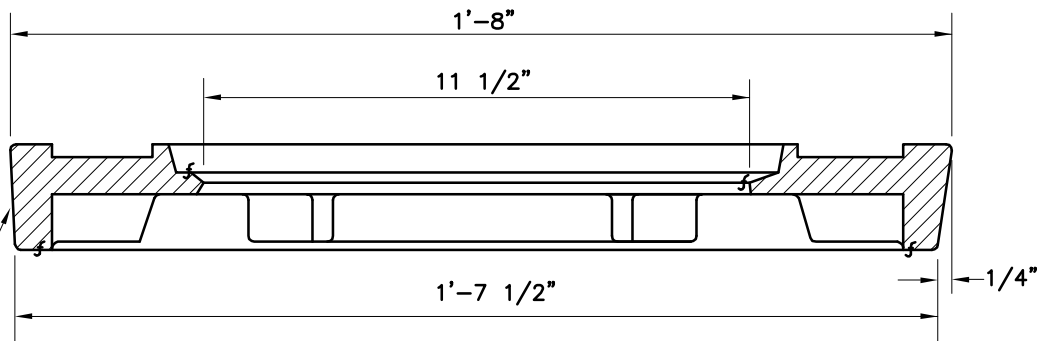
SCALE : NONE

SHEET 2 OF 3





PLAN



SECTION A-A

SEE SECTION B-B FOR DETAILS.



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CITY OF BALTIMORE
 DEPARTMENT OF PUBLIC WORKS
 BUREAU OF WATER AND WASTEWATER

18" X 12" METER FRAME ADAPTER

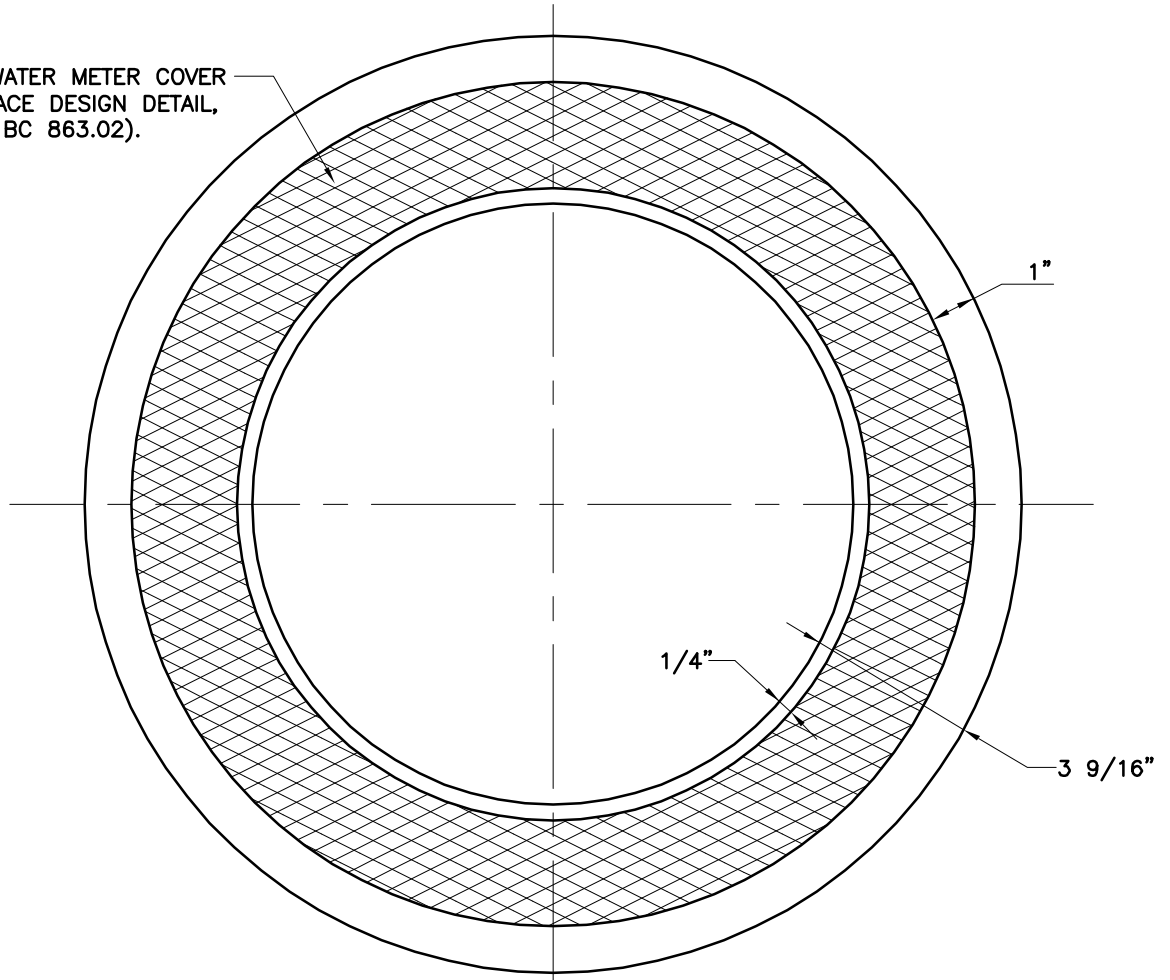
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 874.01

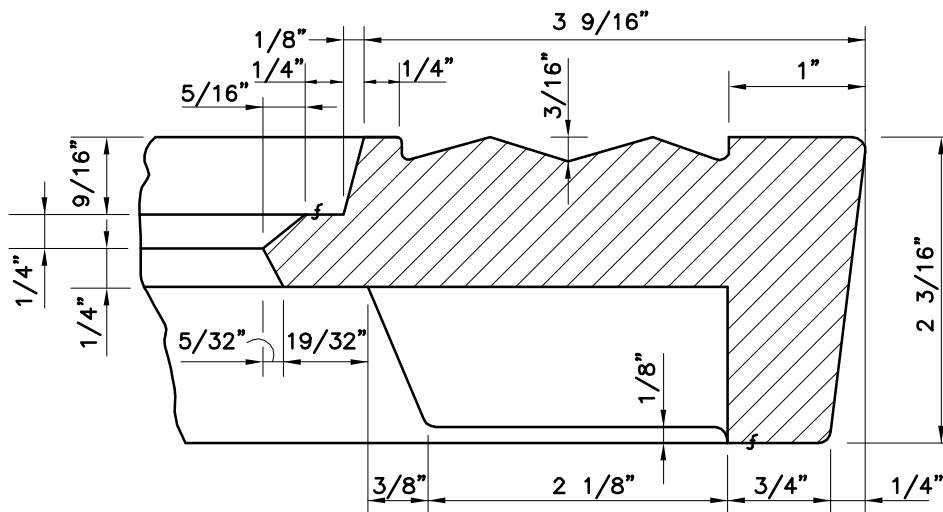
SCALE : NONE

SHEET 1 OF 2

SEE 12" WATER METER COVER
FOR SURFACE DESIGN DETAIL,
(STD. NO. BC 863.02).



GRID PLAN



SECTION B-B

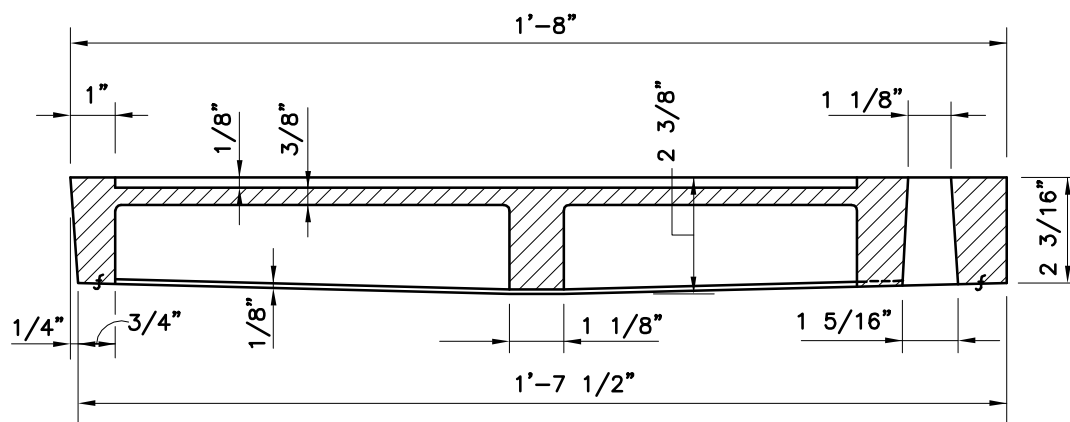
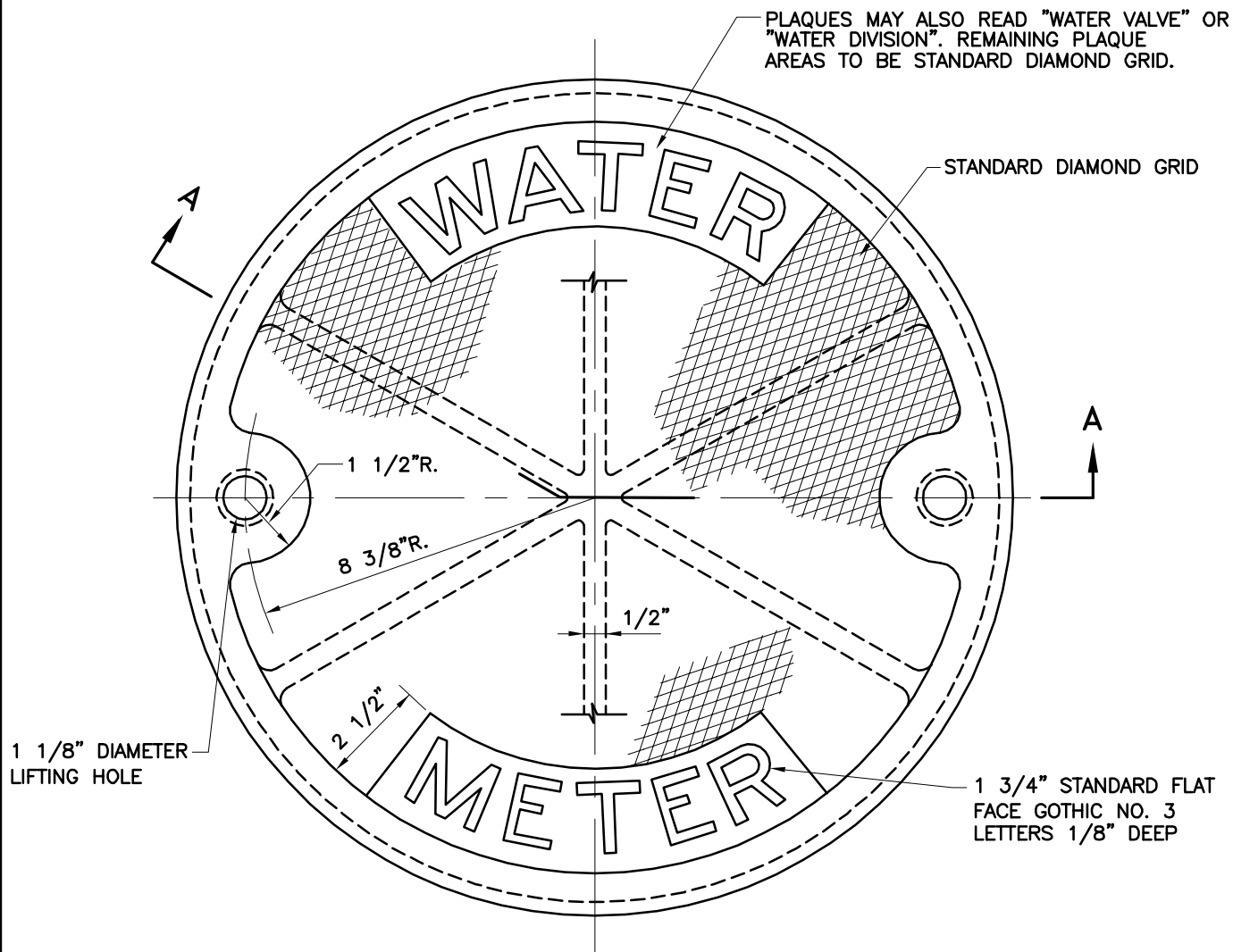


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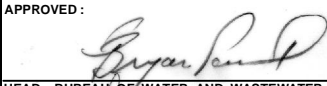
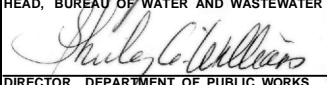
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

18" X 12" METER FRAME ADAPTER

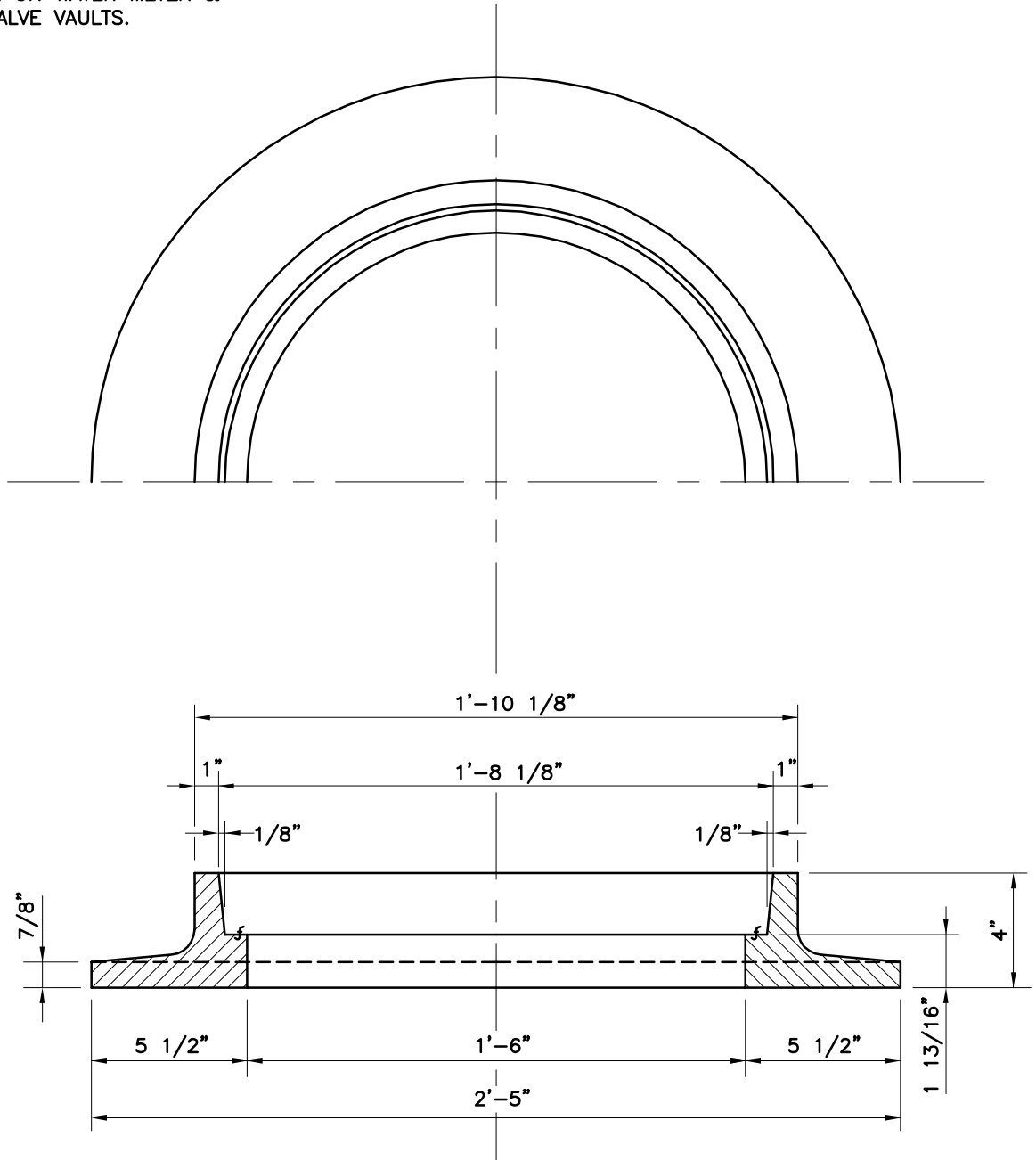
ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 874.01		
SCALE : NONE		SHEET 2 OF 2



SECTION A-A

	APPROVED :	CITY OF BALTIMORE DEPARTMENT OF PUBLIC WORKS BUREAU OF WATER AND WASTEWATER STANDARD 18" MANHOLE COVER - WATER	ISSUED	REVISED	REVISED
	 HEAD, BUREAU OF WATER AND WASTEWATER  DIRECTOR, DEPARTMENT OF PUBLIC WORKS		3 / 2008		
			STANDARD NO. BC 875.01		
			SCALE : NONE		

FOR USE ON WATER METER &
WATER VALVE VAULTS.



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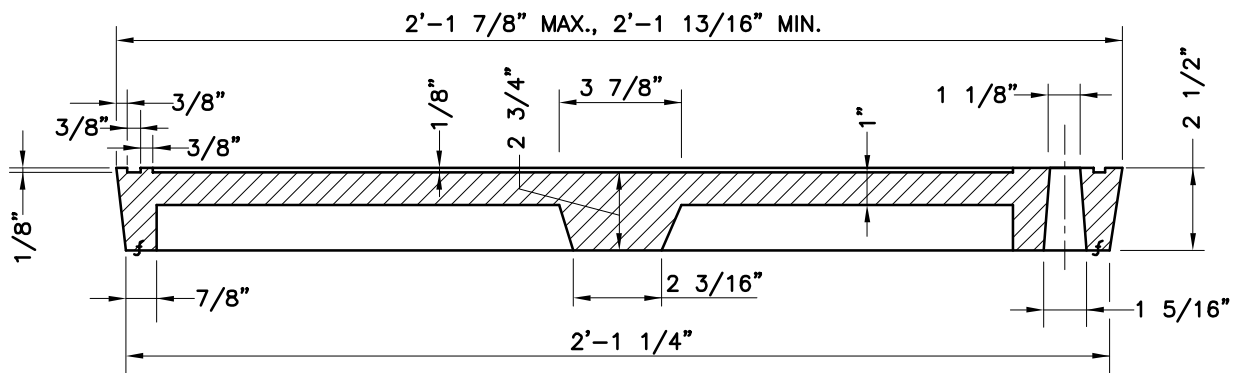
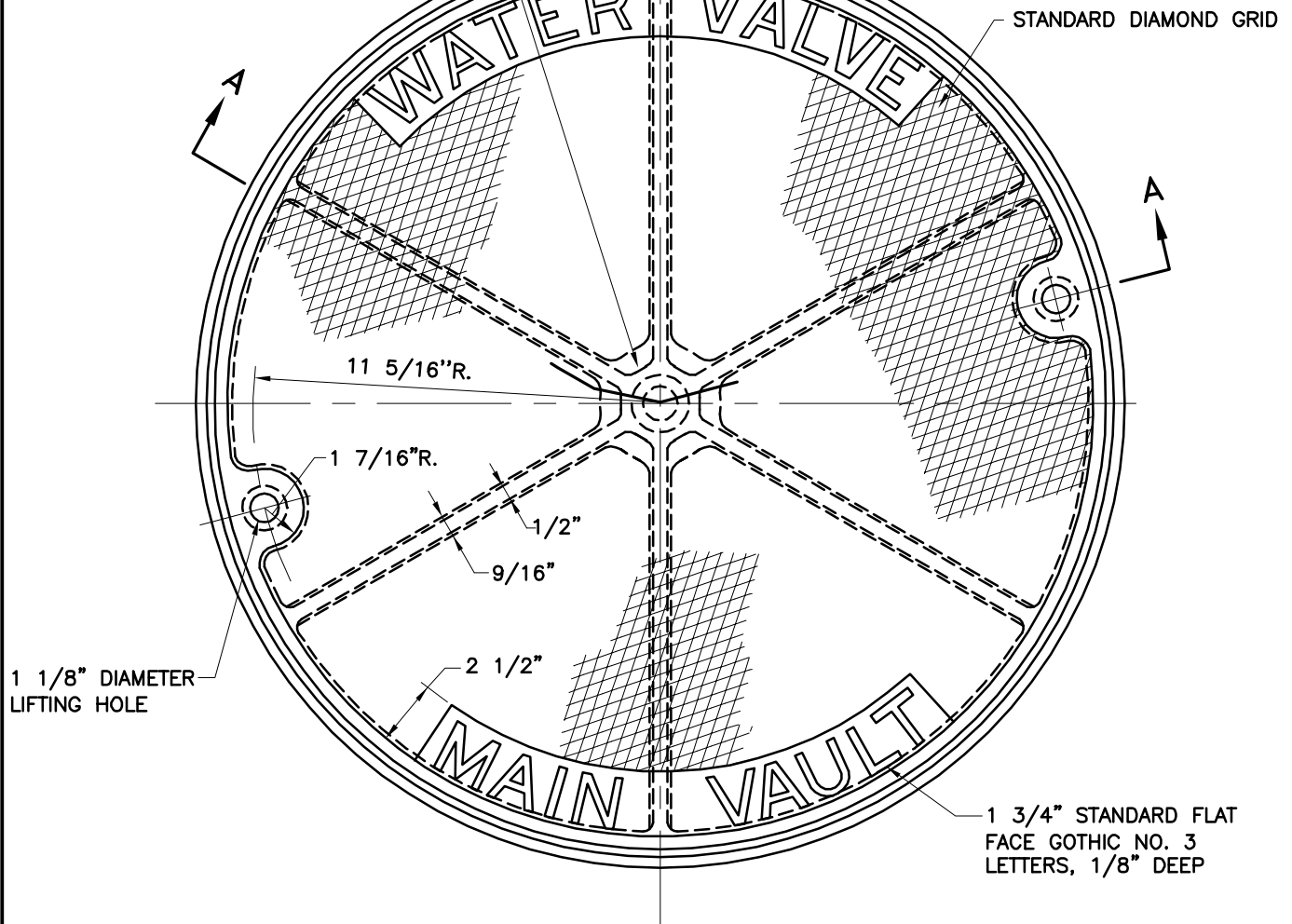
CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BUREAU OF WATER AND WASTEWATER

STANDARD 18" MANHOLE FRAME

ISSUED	REVISED	REVISED
3 / 2008		
STANDARD NO. BC 875.01		
SCALE : NONE		SHEET 2 OF 2

PROVIDE HOLE FOR LOCKING BOLT WHEN REQUIRED (SANITARY AND STORM DRAIN COVERS ONLY).

PLAQUES MAY ALSO READ "WATER METER", "WATER VAVLE" OR "WATER VALVE-DIVISION". REMAINING PLAQUE AREAS TO BE STANDARD DIAMOND GRID.



SECTION A-A

THIS COVER IDENTICAL WITH STANDARD 24\"/>



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 BUREAU OF WATER AND WASTEWATER

STANDARD 24" MANHOLE COVER - WATER

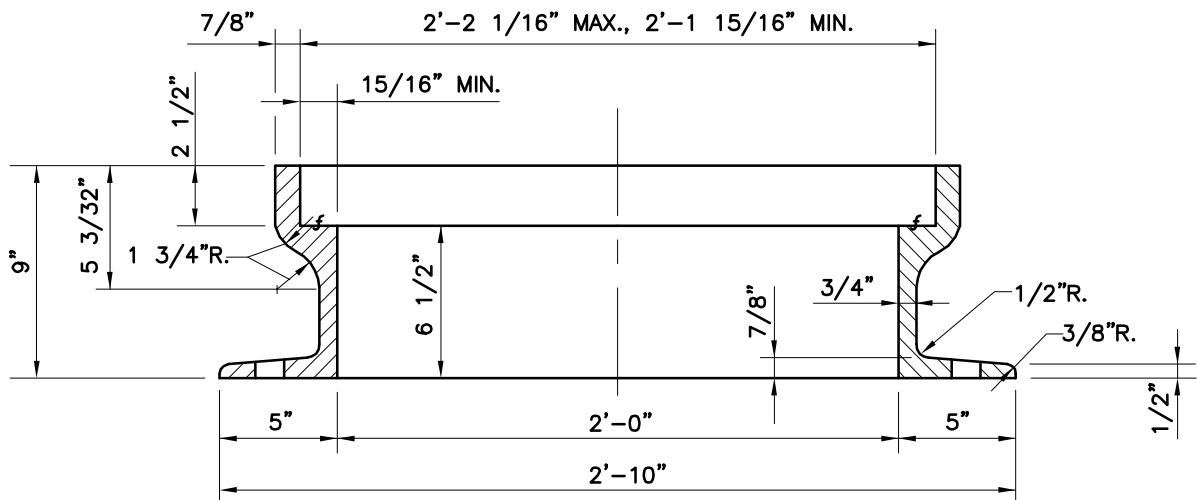
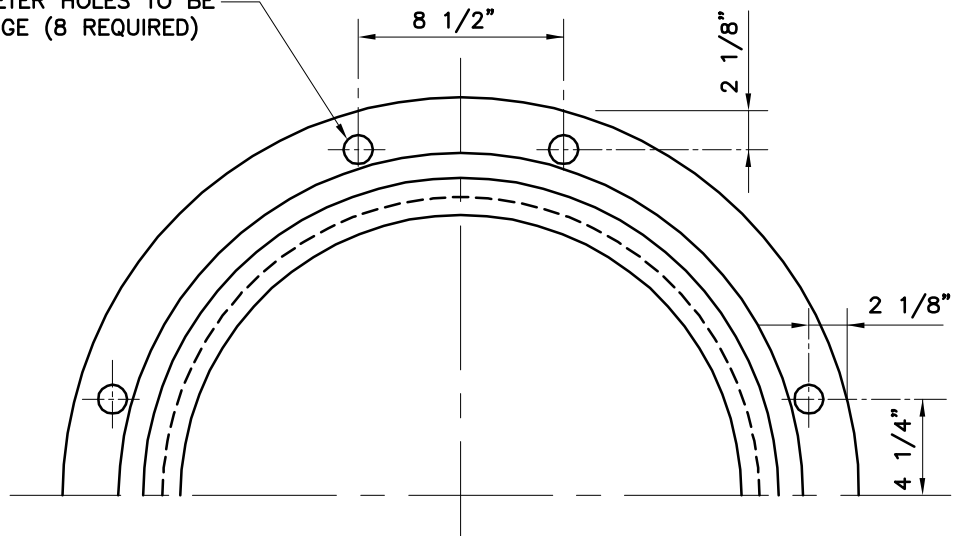
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
 BC 876.01

SCALE : NONE

SHEET 1 OF 2

1 1/4" DIAMETER HOLES TO BE
CAST IN FLANGE (8 REQUIRED)



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CITY OF BALTIMORE
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STANDARD 24" MANHOLE FRAME - WATER

ISSUED REVISED REVISED

3 / 2008

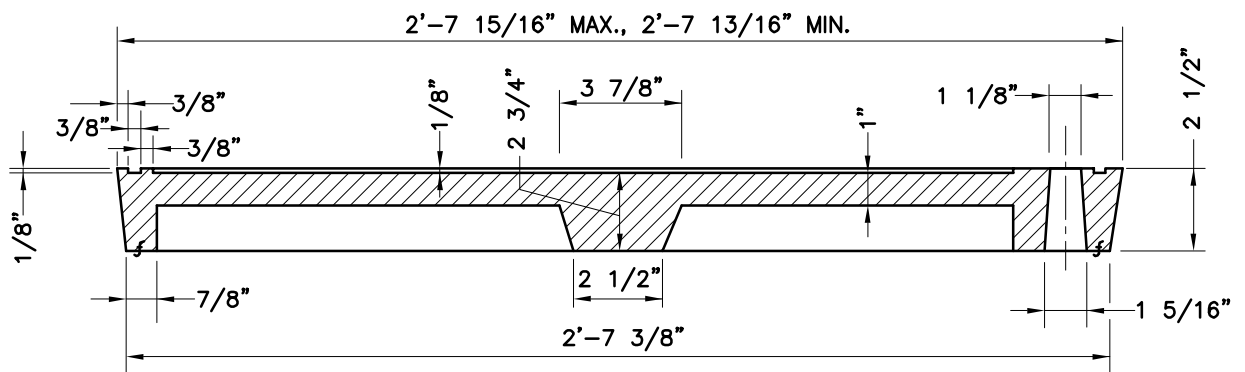
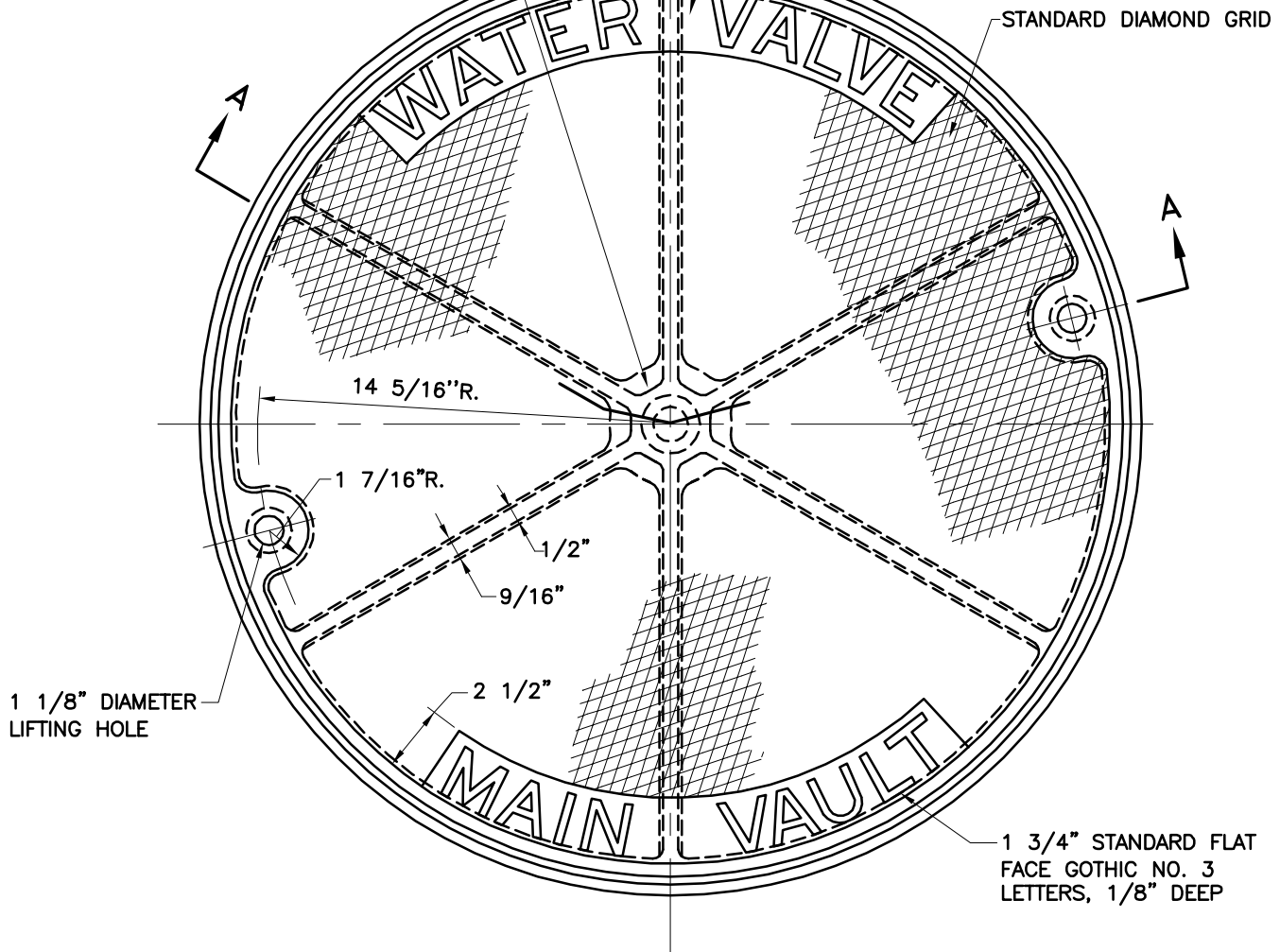
STANDARD NO.
BC 876.01

SCALE : NONE

SHEET 2 OF 2

PROVIDE HOLE FOR LOCKING BOLT WHEN REQUIRED (SANITARY AND STORM DRAIN COVERS ONLY).

PLAQUES MAY ALSO READ "WATER METER", "WATER VAVLE" OR "WATER VALVE-DIVISION". REMAINING PLAQUE AREAS TO BE STANDARD DIAMOND GRID.



SECTION A-A

THIS COVER IDENTICAL WITH STANDARD 30" SANITARY AND STORM DRAIN COVERS (EXCEPT FOR 1" DIAMETER PERFORATIONS IN STORM DRAIN COVERS).



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DEPARTMENT OF PUBLIC WORKS
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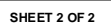
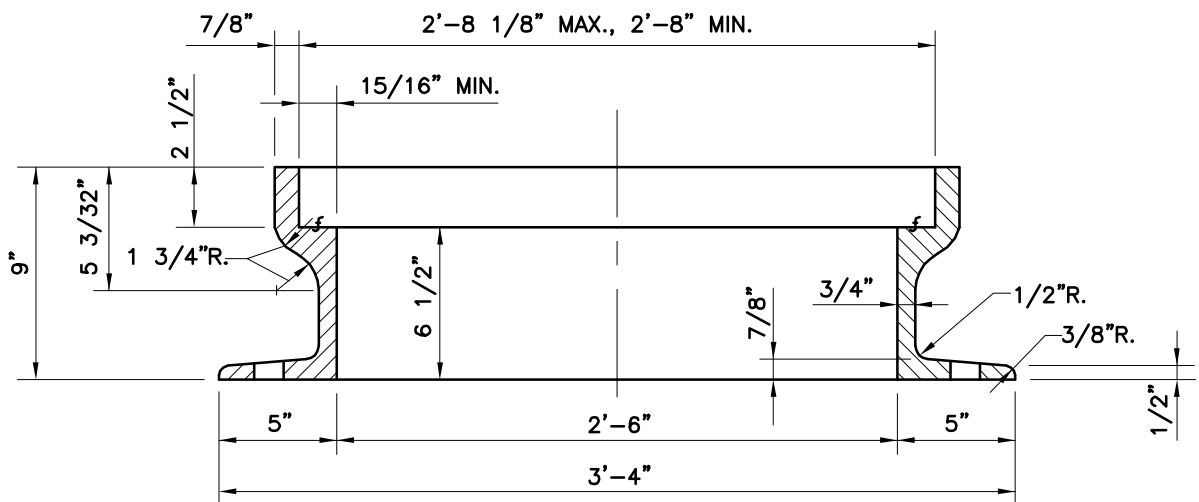
STANDARD 30" MANHOLE COVER - WATER

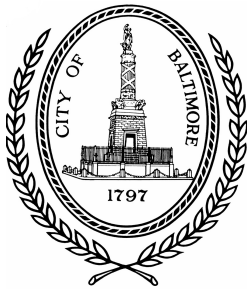
ISSUED	REVISED	REVISED
3 / 2008		

STANDARD NO.
BC 877.01

SCALE : NONE

SHEET 1 OF 2





Appendix

March 2008

**CITY OF BALTIMORE
DEPARTMENT OF PUBLIC WORKS
BOOK OF STANDARDS
CROSS INDEX OF DRAWINGS**

STORM WATER DETAILS:

Old Std. No.	Dwg. No.	Description	Pages
BC 302.01 1 OF 2	BC 302.02	Gravel Cradle for R.C.P. Storm Drains	1 of 1
BC 302.01 2 OF 2	BC 302.03	Gravel Cradle for P.V.C. Storm Drains	1 of 1
	BC 302.04	Gravel Cradle for HDPE Storm Drains	1 of 1
BC 318.01	BC 318.02	Concrete or Brick 'Y' Single or Double	1 of 1
BC 320.01	BC 320.01	Brick and Concrete Curves for Storm Drains	1 of 1
BC 350.01	BC 350.02	End Support Wall Circular and Elliptical Pipe	1 of 2
BC 350.01	BC 350.02	End Support Wall Circular and Elliptical Pipe Tables	2 of 2
BC 352.01	BC 352.02	Type 'B' Endwalls B-48, B-54, B-60, B-66, B-72, B-78, B-84	1 of 1
BC 354.01	BC 354.02	Type 'C' Endwall Circular and Elliptical Pipe	1 of 2
BC 354.01	BC 354.02	Type 'C' Endwall Circular and Elliptical Pipe Tables	2 of 2
BC 356.01	BC 356.02	Type 'E' Endwall Circular and Elliptical Pipe	1 of 2
BC 356.01	BC 356.02	Type 'E' Endwall Circular and Elliptical Pipe Tables	2 of 2
BC 358.01,	BC 358.02	Type 'F' Endwall Circular and Elliptical Pipe	1 of 2
BC 358.02,	"	"	"
BC 358.11,	"	"	"
BC 358.12	"	"	"
BC 358.01,	BC 358.02	Type 'F' Endwall Circular and Elliptical Pipe Tables	2 of 2
BC 358.02,	"	"	"
BC 358.11,	"	"	"
BC 358.12	"	"	"
BC 358.91	BC 358.91	Standard Type 'F' Endwall Modifications	1 of 1
BC 360.01	BC 360.02	Type 'G' Endwall Circular and Elliptical Pipe	1 of 1
BC 360.91	BC 360.91	Standard Type 'G' Endwall Modifications	1 of 1
BC 368.01	BC 368.01	Concrete End Section Circular Pipe - Option No. 1	1 of 1
BC 368.02	BC 368.02	Concrete End Section Circular Pipe - Option No. 2	1 of 1
BC 370.01	BC 370.02	Metal End Section Circular Pipe	1 of 2
BC 370.11	BC 370.02	Connections Metal End Sections Circular Pipe	2 of 2
BC 376.01	BC 376.01	Type No. 1 'E' Grate(s) and Frame	1 of 1
	BC 376.02	Curved Vane (E-CV) Grate(s) with Class 35 Type 'E' Frame New Construction	1 of 1
	BC 376.03	Curved Vane (E-CV) Grate(s) for Existing Type No. 1 'E' Frame	1 of 1
BC 376.13	BC 376.14	Type 'E' Inlet	1 of 1

BC 376.22	BC 376.22	Precast Special Curb for Undepressed 'E' Combination Inlet	1 of 2
BC 376.22	BC 376.22	Precast Special Curb for Depressed 'E' Combination Inlet	2 of 2
BC 376.23	BC 376.24	Type 'E' Combination Inlet	1 of 1
BC 376.29	BC 376.30	Duplex Type 'E' Inlet	1 of 1
BC 376.53	BC 376.54	Type 'H' Inlet	1 of 1
BC 376.62	BC 376.62	Type No. 2 'H' Grate	1 of 1
BC 376.63	BC 376.64	Type 'H' Combination Inlet	1 of 1
BC 376.91	BC 376.91	Precast Type 'H' Inlet Head	1 of 1
BC 376.92	BC 376.92	Curb Armor for Type 'H' Inlet Head	1 of 1
BC 376.93	BC 376.93	18 In. Inlet Frame and Cover	1 of 1
BC 377.11	BC 377.12	Type 'J' Chute Inlet	1 of 1
BC 379.01	BC 380.01	Type 'S' Inlet Single Grate	1 of 1
BC 379.02	BC 380.02	Type 'S' Frame and Grate Parallel Bars	1 of 1
BC 379.03	BC 380.03	Type 'S' Frame and Grate Sections Parallel Bars	1 of 1
BC 379.04	BC 380.04	Type 'S' Frame and Grate Transverse Bars	1 of 1
1 OF 2			
BC 379.04	BC 380.05	Type 'S' Frame and Grate Sections Transverse Bars	1 of 1
2 OF 2			
	BC 380.06	Curved Vane (S-CV) Grate(s) with Class 35 Type 'S' Frame New Construction	1 of 1
	BC 380.07	Curved Vane (S-CV) Grate(s) for Existing Type 'S' Frame	1 of 1
BC 379.11	BC 380.11	Type 'S' Inlet Single Grate (Ditch Installation)	1 of 1
BC 379.21	BC 380.21	Type 'S' Inlet Double Grate Tandem	1 of 1
BC 379.31	BC 380.31	Type 'S' Inlet Double Grate Tandem (Ditch Installation)	1 of 1
BC 379.51	BC 380.51	Type 'S' Combination Inlet Double Grate Tandem	1 of 1
BC 379.52	BC 380.52	Precast Special Curb Type 'S' Combination Inlet Double Grate Tandem	1 of 1
BC 379.53	BC 380.53	Beam and Plate Detail Type 'S' Combination Inlet Double Grate Tandem	1 of 1
BC 379.99	BC 380.99	Method of Depressing Paving at Inlets	1 of 1
BC 383.01,	BC 383.02	Brick or Cast in Place Standard Storm Manhole	1 of 1
BC 383.04	BC 383.04	48" Dia. Precast Storm Manhole for 15" to 24" Pipes	1 of 1
BC 383.05	BC 383.05	60" Dia. Precast Storm Manhole for 27" to 36" Pipes	1 of 1
BC 383.06	BC 383.06	72" Dia. Precast Storm Manhole for 42" to 48" Pipes	1 of 1
	BC 383.07	84" Dia. Precast Storm Manhole for 54" to 60" Pipes	1 of 1
BC 383.11	BC 383.21	Standard 24 In. Manhole Cover	1 of 1
BC 383.12	BC 383.22	Standard 24 In. Manhole Frame	1 of 1
BC 383.13	BC 383.23	Standard 30 In. Manhole Cover	1 of 1
BC 383.14	BC 383.24	Standard 30 In. Manhole Frame	1 of 1
BC 383.15	BC 383.25	Locking Device for Manhole Frame and Cover	1 of 1
BC 383.31	BC 383.31	Typical Manhole Channels: Standard Channel No. 1, Standard Channel No. 2	1 of 1
BC 383.32	BC 383.32	Typical Manhole Channels: Standard Channel No. 3, Standard Channel No. 4, Standard Channel No. 5	1 of 1

BC 383.33	BC 383.33	Typical Manhole Channels: Standard Channel No. 6, Standard Channel No. 7	1 of 1
BC 383.34	BC 383.34	Typical Manhole Channels: Standard Channel No. 8, Standard Channel No. 9, Standard Channel No. 10	1 of 1
BC 383.35	BC 383.35	Typical Manhole Channels: Standard Channel No. 11, Standard Channel No. 12	1 of 1
BC 383.90,	BC 383.92	Stainless Steel Manhole Step	1 of 1
	BC 383.93	Polypropylene Manhole Step for Precast Manholes	1 of 1
BC 386.41	BC 386.41	Concrete Cradle for R.C.P. Storm Drains	1 of 1
BC 386.51	BC 386.51	Concrete Encasement for Storm Drains	1 of 1
BC 389.01	BC 389.01	Standard Berm Ditches Concrete and Sod	1 of 1
BC 389.02	BC 389.02	Standard Side Ditches - V Slope	1 of 1

WASTEWATER DETAILS:

Old Std. No.	Std. No.	Description	Pages
BC 830.01 1 OF 3	BC 830.01	Gravel Cradle for E.S.C.P. Sanitary Sewers	1 of 1
BC 830.01 2 OF 3	BC 830.02	Gravel Cradle for R.C.P. Sanitary Sewers	1 of 1
BC 830.01 3 OF 3	BC 830.03	Gravel Cradle for P.V.C. Sanitary Sewers	1 of 1
BC 830.02	BC 830.04	Concrete Encasement for Sanitary Sewers	1 of 1
BC 830.03	BC 830.05	Standard Brick and Concrete Curves for Sanitary Sewers	1 of 1
BC 830.04	BC 830.06	Concrete Cradle for Sanitary Sewers	1 of 1
BC 830.13	BC 830.13	Typical Plugging Detail Sanitary House Connection	1 of 1
BC 830.10	BC 830.14	Typical Installations of Sanitary House Connections	1 of 1
BC 830.11	BC 830.15	Typical House Connection with Cleanout in Public Right of Way	1 of 1
BC 830.12	BC 830.16	Typical Installations of Standpipe House Connections	1 of 1
	BC 830.17	Saddle Installation Detail for New House Connection to Existing Sewer	1 of 1
	BC 830.18	Pipe Replacement Detail for New House Connections to Existing Sewers	1 of 1
	BC 830.19	Measuring and Recording As Built Location of New Sanitary House Connections	1 of 2
	BC 830.19	Measuring and Recording As Built Location of New Sanitary House Connections	2 of 2
	BC 830.20	Typical Detail for Leakage Exfiltration Testing	1 of 1
BC 870.01	BC 831.01	Standard Brick Sanitary Manhole	1 of 1
BC 870.02	BC 831.02	Sanitary Manhole Type C	1 of 1
BC 870.03	BC 831.03	Sanitary Terminal Manhole	1 of 1

BC 870.35	BC 831.04	48" Diameter Precast Sanitary Manhole for Pipe Diameters up to 24"	1 of 1
BC 870.36	BC 831.05	60" Diameter Precast Sanitary Manhole for Pipe Diameters up to 36"	1 of 1
BC 870.37	BC 831.06	72" Diameter Precast Sanitary Manhole for Pipe Diameters up to 48"	1 of 1
BC 870.39	BC 831.07	48" Diameter Precast "Doghouse" Riser for Pipe Diameters up to 24"	1 of 1
	BC 831.08	60" Diameter Precast "Doghouse" Riser for Pipe Diameters up to 36"	1 of 1
BC 870.04	BC 831.09	Sanitary Type A Drop Connection/Sanitary Type B Drop Connection	1 of 1
	BC 831.10	Manhole Abandonment	1 of 1
BC 870.05	BC 831.20	Sanitary Offset Manhole 30" Cover	1 of 1
BC 870.06	BC 831.21	Standard Sanitary Manhole Precast Slab	1 of 1
BC 870.07	BC 831.22	Precast Manhole Slab for 24" Frame	1 of 1
BC 870.08	BC 831.23	Special Fittings	1 of 1
BC 870.11	BC 831.24	Standard San. 24" Manhole Cover	1 of 1
BC 870.12	BC 831.25	Standard 24" Manhole Frame	1 of 1
BC 870.13	BC 831.26	Standard Sanitary 30" Manhole Cover	1 of 1
BC 870.14	BC 831.27	Standard 30" Manhole Frame	1 of 1
BC 870.15	BC 831.28	Locking Device for Manhole Frame & Cover	1 of 1
	BC 831.29	Cleanout Cover Assembly	1 of 1
BC 870.16	BC 831.30	Type 1 Step for Brick Manholes	1 of 1
BC 870.17	BC 831.31	Type 2 Step for Precast & Cast in Place Manholes	1 of 1
	BC 831.32	Copolymer Polypropylene Steps for Precast and Cast in Place Manholes	1 of 1
BC 870.30	BC 831.35	Typical Manhole Channels Standard Channel No.1 and No.2	1 of 1
BC 870.31	BC 831.36	Typical Manhole Channels Standard Channel No.3, No.4 and No.5	1 of 1
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